ENGINEERING NEWS-RECORD

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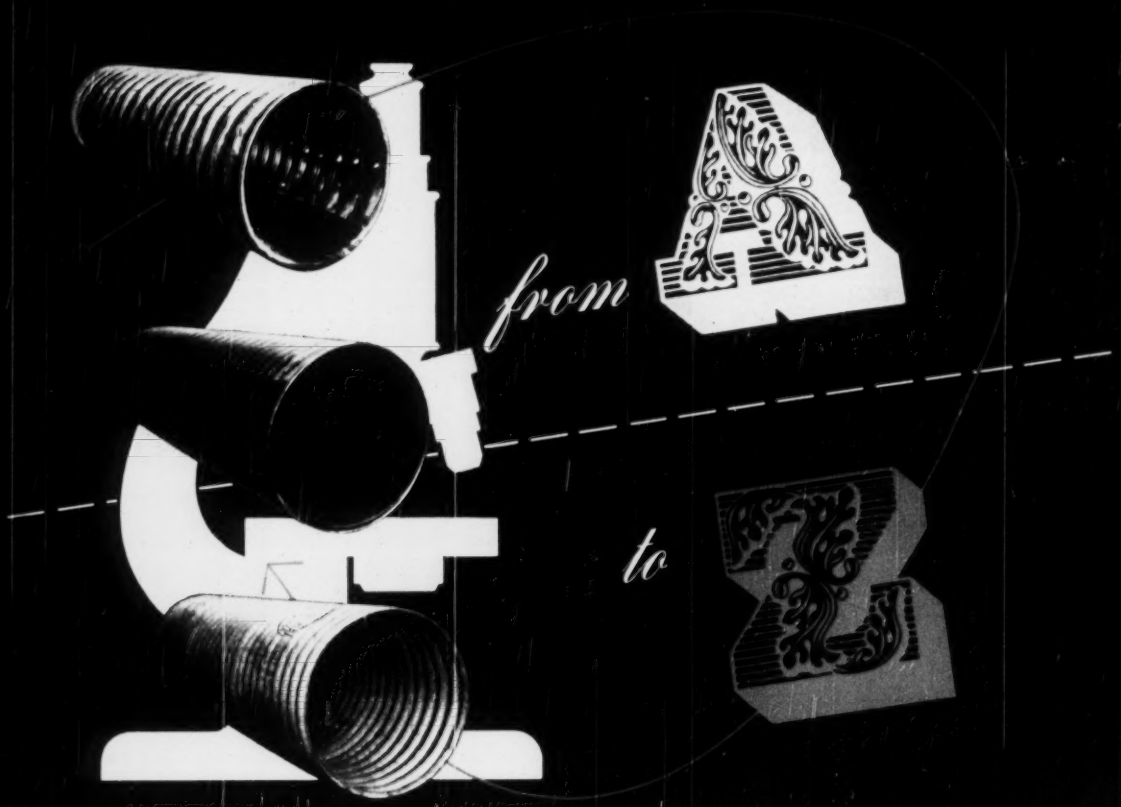

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ENGINEERING NEWS-RECORD

Volume 144 APRIL 27, 1950 No. 17

WALDO G. BOWMAN
Editor

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Labor	15¢ per sq. ft.	23¢ per sq. ft.	Total Labor Saving $3200.00

*Based on 25 uses @ an approx. cost of $1.60 per sq. ft. with 50% salvage.
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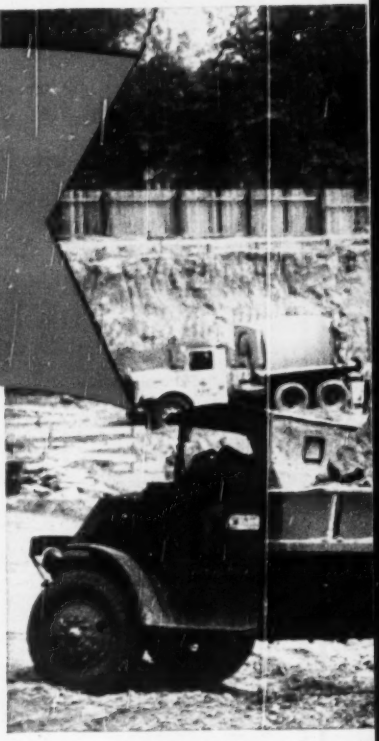

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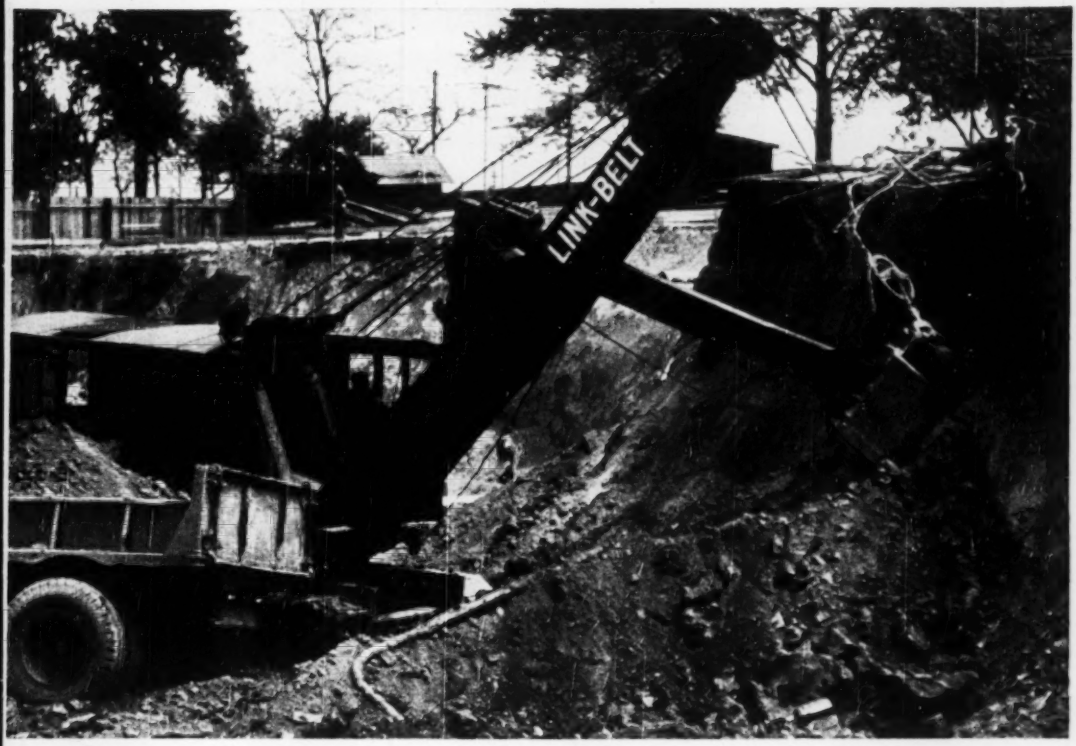

EVEN the roughest service won't pound or squeeze *Texaco Marfak* out of chassis bearings. This famous lubricant assures protection against wear and rust for extra hundreds of miles. *Texaco Marfak* saves parts replacements, keeps equipment on the job and out of the repair shop. And because *Texaco Marfak* is so long lasting, fewer applications are needed—another saving.

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NEWS BRIEFS

$500 Million Argument—The Senate lost little time passing its version ($1.6 billion) of the Omnibus Flood Control Rivers and Harbors authorization bill last week (ENR April 20, p 23). A conference committee will settle the $500 million discrepancy between House and Senate versions.

Are You Listenin', Johnson? Adm. Louis Denfeld, former Chief of Naval Operations, says he'll accept appointment as director of the Port of Boston provided he's assured that he'll have no political interference whatsoever.

Inflation's Everywhere — American Standards Association reports that, in 1949, it approved new and revised standards at about double the rate it achieved during the war years, when its activity was speeded. It ok'd more than five times as many standards last year as its annual average during its first 13 years of operation. There are 160 ASA standards in the civil engineering field.

Speed the Day—E. J. McGrew, Jr., chairman of New York's statewide building code committee, told a public hearing that construction costs of one- and two-family dwellings may be reduced as much as 10 percent under the impending code. The savings, he said, could flow from the "elimination of obsolete provisions and restrictive practices in many of our codes, which are up to 30 or 40 years old."

Wanna Build a Toll Road?—Pennsylvania's Turnpike Commission took time off from building its eastern and western extensions recently to find a German-speaking employee, transport him to Berlin, Pa., and have him record a comparison of the turnpike and Germany's Autobahn. The recording, which emphasizes the difference between the turnpike, built with free labor, and the Autobahn, built with forced labor, will be broadcast by the Voice of America. That chore complete, the commission began coping with a local fracas on its western extension. It had named a new interchange the "Oakmont" interchange, for a nearby Pittsburgh suburb, even though it's in Harmar Township, three miles away. Already, petitions have reached the governor demanding that it be named the "Harmarville" Interchange. And all the commission set out to do was build roads.

Never Underestimate, etc.—Boston

(Continued on page 13)

Dig and dump . . . speed the cycle . . . take those shocks . . . *stay on the job*—that's the big order you give a hoist rope. To have it filled, put *Preformed* Yellow Strand Hoist Rope on your power shovel. Specify Lang Lay with Independent Wire Rope Core—6 x 19 for ropes up to and including 1" in diameter, 6 x 41 for sizes 1⅛" and larger.

In *Preformed* Yellow Strand, whatever the construction, internal stresses have been relaxed. You gain with longer rope life, fewer shutdowns for replacement, more production for your rope dollar. Call your B & B distributor now so you'll have a real *working* rope on hand when it's time to change your hoist, drag, scraper or other heavy-duty line.

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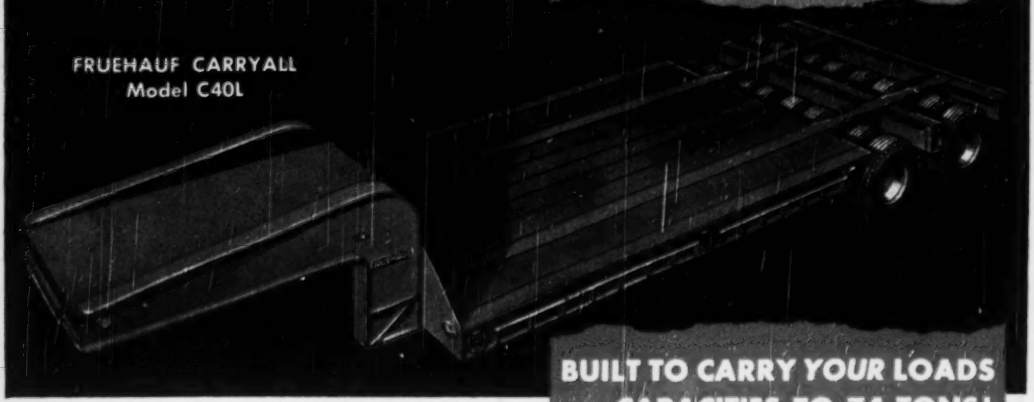

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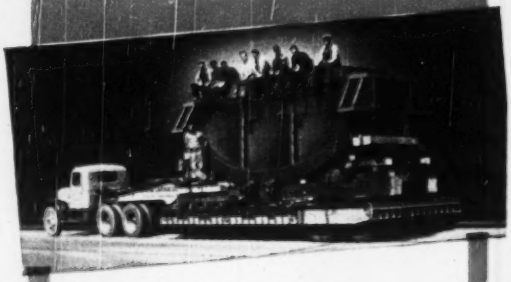

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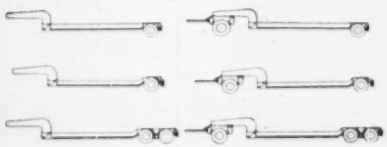

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EIMCO RockerShovel 104

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The Eimco 104 RockerShovel is designed for loading heavy, abrasive rock or sand and gravel using a 1¼ yard bucket for heavy rock, and a 2 yard bucket for sand and gravel. The 104 is available with a 48 H.P. Diesel engine, or 30 H.P. Electric motor.

This machine is ideal for loading, bulldozing, or cleaning in roadwork, quarries, stock piles, and mines. Operators are finding new uses for it every day.

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(Continued from page 5)

Women don't like the "park and shop" developments that have been springing up there. They're complaining that they have to walk too far from parking spaces to the shops, that high heels and soft ground don't mix easily, particularly when they face hours of sauntering up and down store aisles.

Double-Purpose Steam—A 50-man Canadian construction crew worked in shirtsleeves through one of Saskatchewan's coldest winters building a concrete dam at Cowan Lake, 100 mi northwest of Prince Albert. The men worked inside a wooden frame, canvas-covered, insulated building which was steam-heated to keep the concrete from freezing in the 64-below cold. Begun last September to replace a wooden dam which burned, the job was finished early this month.

THE COVER

Vinton W. Bacon, the 33-year-old sanitary engineer who is now executive director of California's new State Water Pollution Control Board, has taken on a big job: He's heading up something brand new in the concept of pollution control.

The new angle is contained in the legislation (ENR July 21, 1949, p29) creating the 13-member board. It provides that the four state official members (director of natural resources, director of public health, state engineer and director of agriculture) and the nine other members must represent both water users and potential water polluters. The state is divided into nine regions—each corresponding to a separate watershed, each represented on the state board and each administered by a regional board to act as a local enforcement agency (by means of injunction). The state board will coordinate activities of other agencies, through its power to require any state or local agency to "inspect and report on . . . factors involved in water pollution."

Son of a South Dakota veterinarian, Bacon moved with his family to California in 1933, graduated in sanitary engineering from the University of California in 1940. He was a design engineer for Los Angeles County sanitation districts, spent three wartime years in the U. S. Public Health Service (he wound up with the rank of captain), worked two postwar years with the Orange County sanitation districts, and finally became head of a sanitary engineering research program at the University of California, before taking his present post.

He's now engaged, among other things, in looking for a new home in Sacramento—which will be the third new home within a year for his wife and their two children.

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6. High-speed track assemblies with new recoil mechanism that holds front idlers in position against full-load track pull.

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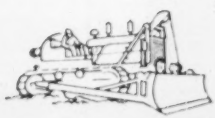

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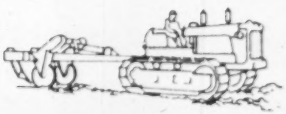

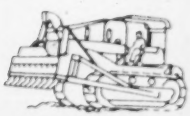

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THE CONSTRUCTION WEEK

HEALTH PLAN IN TROUBLE—New England's first health and welfare program for the construction industry isn't too pert at the moment—federal court judges have been called in to prescribe a cure. The plan was set up by building contractors and an operating engineers' union at Springfield, Mass., four months ago. It was supposed to work like this: Under the joint management of union and contractor representatives, a fund would be built up by contributions from the contractors of three percent of their payrolls; the fund would be used to provide hospitalization, surgical aid and insurance benefits for the 700 operating engineers in the area. But the union and contractor "managers" couldn't agree. Finally, the union man authorized a life insurance company (Union Label Life) to handle the coverage, without approval by the management man. The company began paying benefits—but when it presented its own bill for payment, the management manager refused to OK payment, claiming he hadn't approved the original agreement, so he couldn't rule on the bills.

PUMPS COME FIRST—Something out of the ordinary in large pumping station design is set up for Memphis' planned $3,500,000 Allen pumping station: On recommendation of consulting engineers (Black and Veatch, of Kansas City) the city light, gas and water commissioners have voted to buy the pumping machinery first, then design the building around it. Bids for equipment to handle the station's planned 30 mgd capacity will be called June 8. Engineers told commissioners that they'd save money by waiting to see size of the machinery, rather than designing a building (as has been past practice) high enough and wide enough to take biggest machinery that might be offered by a bidder.

INDUSTRY HELPS—Sign of increasing industry interest in stream-pollution control efforts is the formation of a 10-company committee of steelmakers (ENR March 16, p 25) to aid cleanup of Ohio River tributaries. Working with the Ohio River Valley Water Sanitation Commission, the steelmen will lend their research facilities, personnel and experience to suggest ways of controlling the pollution of the tributary Mahoning River, and to speed installation of waste-control methods in steel plants.

NEED COUNSEL FOR COUNSEL—Construction men need the services of an independent counsel to the National Labor Relations Board, to counsel them on matters that have no precedent. Such a counsel, said J. D. Marshall, AGC assistant managing director (to a Senate committee considering Reorganization Plan 12 that would abolish the counsel's office) can give broad explanations of the law's application to construction without committing NLRB to prejudge cases. The construction industry is having enough trouble applying and anticipating T-H requirements, Marshall indicated, without adding to the difficulty of getting interpretations.

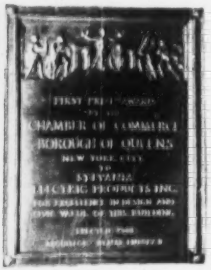
BAY BRIDGE OUT?—Something peculiar goes on about San Francisco's much-fought-over second Bay crossing. Although an engineering organization has been built up to handle the second crossing, newspapers that fought the favored parallel bridge announced the "apparent death" of the plan some days ago, and proponents admit that the project is indefinitely postponed. Trouble seems to stem from inability—despite months of bickering, hearings and action—to reconcile proponents of a southern crossing (ENR Feb. 13, 1947, p 3) approved by a joint Army-Navy board, and various other ideas including the Reber Plan (ENR Nov. 24, 1949, p 28) which would convert part of the bay into lakes. What happens to the California Toll Bridge Authority's special Bay Bridge Division and its staff is a question.

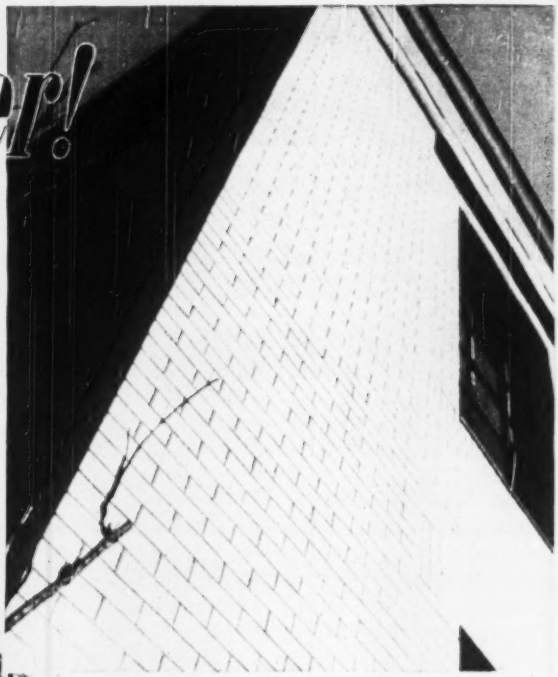
NOT DEAD YET—The issue of who (the U. S. Dept. of Interior or Virginia Electric and Power Co.) will build the works at Roanoke Rapids isn't dead yet. After an FPC examiner (ENR March 30, p 17) had decided that VEPCO should handle the development, Interior filed a motion to reopen the hearings. Said VEPCO, in an acid brief: "Reopening of the hearings can only erect a monument of futility against any further application by private capital to develop hydro power in the U. S."

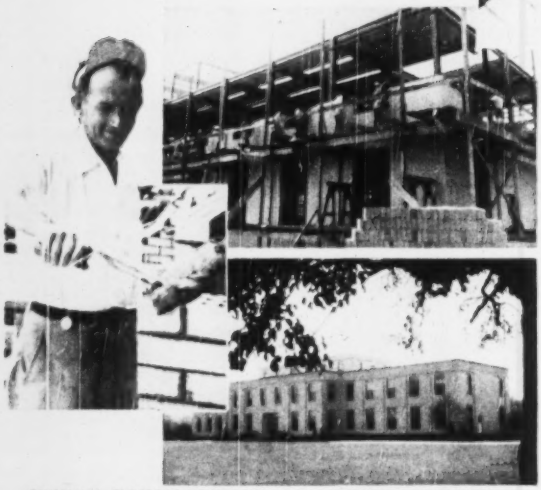
ON THE DOUBLE—We don't offer this as the last word on labor productivity in the 1950 construction boom, but those who find output-per-man-hour deplorable ought to visit ENR's editorial shop and look down 23 floors to where workmen are concreting the roof of the New York Port Authority's new bus terminal. The concrete is brought up five floors from the mixer trucks by skip and deposited in a bin whence small hand carts are filled. The men who handle the hand carts form a continuous line—from the bin to the pouring site and back to the bin. And every time you look at it, the line is moving—often on the double.

Prize-Winner!

SYLVANIA ELECTRIC BUILDING MERITS TOP AWARD







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Ready-Mix Lone Star Concrete: COLONIAL SAND & STONE CO., INC.
Lone Star Masonry Cement: ACE BUILDERS SUPPLY CO., INC.
General Contractor: JOHN H. EISELE COMPANY, INC.
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● Public appreciation of this Physics Laboratory of Sylvania Electric Products, Inc., in Bayside, L. I., was expressed by a Prize Award from the Chamber of Commerce of the Borough of Queens for excellence of design and construction.

Two stories and penthouse high, the building is non-industrial in appearance—it would look at home on any modern college campus. And the substance is as sound as the form is pleasing. For it is Lone Star throughout—Lone Star Portland Cement in foundations and structure...Lone Star Masonry Cement in attractive exterior walls and beautifully tiled interior.

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CONSTRUCTION TRENDS

HOW GOOD CAN BUSINESS GET?

This spring's boom on top of a boom in construction makes one thing worth watching by the industry:

The sudden and unexpected surge in work being started makes it appear that by June manpower and materials could be setting the limits on the amount of construction that can be done.

Apparently, most types of construction will feel the pinch—but the tightest squeeze will come in home building. The greatest material shortages are likely to be among the products that go into new homes.

Almost certainly, there will be no important shortage of construction machinery, from power plants through to the heaviest types.

A survey conducted by ENR last week (see news pages this issue) showed that manufacturers, dealers and contractors generally saw no prospect of any great interruption in the flow of units in response to orders—although the possibility of a great flurry of orders within a short period of time might slow down the delivery schedule somewhat.

Only items that showed up in the survey as being slightly over the normal delivery schedule were such machines as self-propelled scrapers and some larger size shovels—and these items are obviously of not too great concern to the home builder.

In March, homebuilders started 110,000 units—the all-time record month—in what is normally only the start of the construction season. For the first three months as a whole, homebuilders have started around 300,000 permanent non-farm units.

That rate almost certainly will taper off. But the indications are that, for 1950 as a whole, homebuilders will set a new record. And a much bigger share of that work will be engineering construction than was last year.

Here's the outlook as it adds up now: With the backlog of work cleared before the law expired, and $500 million of additional authorizations granted by Congress, starts under Section 608 will run about 150,000 units this year as against 110,000 last year. Other private multi-family building is expected to rise from 50,000 last year to 80,000. Military construction, for which the way is being cleared through changes in the law, is expected to account for 20,000 units this year where there were none in 1949.

Multi-family units under the federal and state public housing laws, although they are slow in getting started, may run to 70,000 units—as against about 35,000 last year.

As this adds up, prospects are for about 320,000 starts on large-scale rental units this year—as against slightly more than 200,000 last year.

With that much large-scale housing, private building of single family homes might drop 100,000 units—and the industry would still top last year's figures. But—as it is shaping up now—private single family building will be close to last year, if it doesn't top the 1949 figure.

The Federal Reserve Board's annual survey of consumer finances—which has become a basic benchmark in marketing—shows that at least as many families plan to buy or build new homes this year as did last year. Demand for homes under $10,000 is stronger now than it was a year ago—and the industry is building more of them.

Behind the prospects for sustaining homebuilding at a high level are, of course, today's high level of employment and incomes. Also, the 1950 housing act on the whole is more liberal than its predecessors. Then too, the temporary suspension of Federal Housing Administration activities and Fanny Mae's purchases of mortgages will have the effect of spreading out demand through the year.

Meanwhile, contracts for other kinds of construction are holding at a very high level. ENR's contract awards for the first 15 weeks of this year ran 39% ahead of last year.

The surge in contracts and starts on homes that has marked the first three months will almost certainly taper off.

But clearly there's enough work underway to have the industry going at close to capacity now. And by mid-summer, when construction would normally hit its seasonal peak, the industry may really be stretched out.

As yet, except in lumber, there have been no marked price increases. Even lumber is still below its 1948 peak. But the volume of work that is ahead clearly will put pressure on prices. And there are likely to be shortages of some materials by mid-summer. Plywood is already short with mills unable to catch up on orders, reports show.

Labor, too, is likely to be short. Contractors are reported to be paying premium wages now. Bricklayers, for example, are getting premium rates for straight work in some areas and there's an increasing volume of weekend work at overtime rates in many building trades.

In short—this summer materials and manpower once again are more likely to put the ceiling on the industry than is any shortage of work.

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Supplying ample compressed air for any location, the CP Portable Air Compressor has a gradual speed regulator that adapts engine speed to air demands to hold fuel consumption to a minimum. Available in gasoline-driven models of 60, 105, 160, 210 and 315 c.f.m. actual capacity, and in Diesel-driven models of 105, 160, 210, 315 and 500 c.f.m.

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Beyond the Science

LEADING EDUCATORS and practitioners have put forward a sound philosophy to guide basic training for sanitary engineers—centering about a longer training period (ENR Feb. 23, 1950, p 112). These far-sighted recommendations—when carried out in college courses—will insure that tomorrow's sanitary engineers will go into practice well equipped to handle the increasingly complex problems of modern civilization. Such preparation lays the technical foundations that such engineers need to dig into untilled fields and come up with fact-based decisions.

But sanitary engineers—or engineers in any of the other specialties—who are merely technical experts are not enough. They need the qualities that inspiring leaders and persuasive teachers usually have. These capabilities—which are not acquired in the classroom—are developed only by rubbing elbows with all types of men, by close observation of human motivations and reactions, by constant study of the caliber of leadership that gets the best, quickest, frictionless results, and by making good use of applied psychology. There can be no doubt that productive human engineering is as important as scientific excellence. Young engineers—in their headlong but commendable pursuit of scientific knowledge—will do well to consider this fact. Real policy-making influence will come when truly competent engineers go beyond their science and exercise effective leadership in enterprises in which they are now merely cogs.

Truck Damage to Roads

MORE LIGHT is cast on the controversial subject of truck damage to highway pavements by a report on "Axle-Load and Gross-Load Trends" in the February, 1950, issue of PUBLIC ROADS. While some overloading is reported, the most important finding about pavement life is the great increase since 1942 in the number of axle loads of 20,000 lb or more per 1,000 vehicles. By 1948 the number had risen to nine times that of the 1936-37 period. And during that time, trucks on the highways almost doubled.

Everyone familiar with highway problems knows that traffic density and vehicle weight are the greatest contributors to pavement destruction. Steady pounding does the damage, and rate of destruction rises as heavily loaded vehicles increase in number. The alarming thing about the report's statistics is that the total of heavy axle loads appears to be accelerating rapidly.

Complaints against truck operators have centered, generally, on overloading, chiefly because it is illegal and so gives highway departments something specific to act on. And operators have replied that only a small percent of the trucks on our highways are overloaded—not enough, numerically to do much damage.

Report figures on axle load trends suggest that density of axle loads—close to or only slightly above the legal limits—is the real controlling factor in pavement destruction. Even if the damage is caused by density rather than occasional overload, truck operators are not relieved of responsibility for bearing more of the cost of replacing damaged highways. If highways—adequate under less traffic—fail as density of legal traffic rises, then truckers making greater use of highways should pay for pavements adequate for that more intensive use.

Make It Safe for Public Employees

PUBLIC ADMINISTRATORS have a wide-open opportunity to cut employee compensation and medical costs as well as reduce human suffering. The accident rate for city workers is far too high. One study covering eight large cities with statistics-collecting and safety programs shows that the average frequency of lost-time injuries per million man-hours of exposure is 30.7. This rate is three times that of comparable private industries. And it puts city employment as the fourth most hazardous occupation in a list of 40 major industries.

Much can be done to clear up this messy picture. By applying intensive safety programs, accidental deaths and personal injuries in industries have been cut down sharply. One meat packer reduced accident losses from $1.25 to $0.11 per $100 of payroll in five years; a refinery trimmed its losses $161,000 a year.

A few cities are effectively exploiting similar safety techniques. San Diego's public works department has driven down lost-time injuries from 82.3 to 21.5 per million man-hours of exposure in five years. The Minnesota department of highways compensation costs were $33,392 less in 1948 than in 1936.

To attack this problem, the National Safety Council—in a special pamphlet, "Public Employee Safety"—has spelled out a number of steps for making public work less hazardous. Briefly these are: The city's chief executive makes safety his responsibility and follows it through departmental application. He appoints an advisory committee for employee safety. Its job is policy making, employee training, record keeping, accident-report review and direction of technical assistants. Then he sets up a safety organization to carry out the objectives. And finally he delegates authority to make the safety program work—particularly at the lowest level.

City officials should study these recommendations with care. And then they can well afford to look closely at their public works operations. Their findings will be a strong incentive to make it safer for public employees.

Ten Years Ago...

A Brand of ATLAS DURAPLASTIC AIR-ENTRAINING PORTLAND CEMENT

in August, 1939, this concrete test paving was laid in Second Avenue North, Minneapolis. The badly scaled section of roadway in the background was made with regular portland cement. The foreground section, *laid at the same time*, was made with Atlas Duraplastic — the first commercial use of the air-entraining portland cement originated and developed by Universal Atlas.

Both sections, subjected to the severity of ten Minneapolis winters and to heavy applications of de-icing salts, are shown just as they appeared in July, 1949—convincing proof of the characteristic durability of Duraplastic concrete, of its high resistance to freezing-thawing weather and the scaling action of de-icing salts. Longitudinal structural crack shows some ravelling. Note perfect transverse joint.

For example: O'Hare Field (formerly Douglas Airport), Park Ridge, Ill. Duraplastic used exclusively. Placed 1942-43. Despite heavy traffic of war and peace ...and the rigors of seven tough winters... paving remains durable and highly scale-resistant. Designed and supervised by U. S. Engineers and the Austin Company; Contractors: Standard Paving Company, White Consolidated, Inc. and Thomas McQueen Company.

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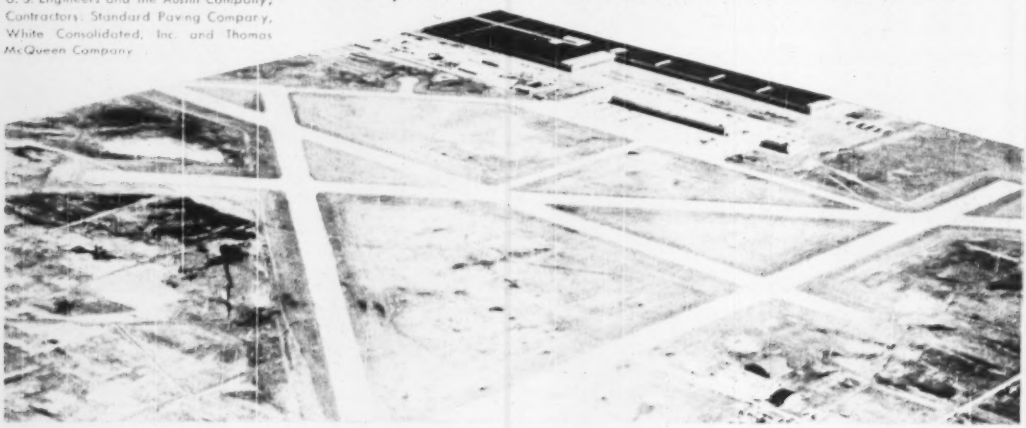

Veteran airport or famous highway, country road or city street, simple sidewalk or service alley... millions of square yards of concrete paving of all kinds... have been proving, since 1939, that Atlas Duraplastic air-entraining cement makes better concrete, more durable concrete, at no extra cost.

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* "Duraplastic" is the registered trade mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.

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ENGINEERING NEWS-RECORD

APRIL 27, 1950 VOL. 144 NO. 17

Survey shows no shortage of construction machinery

ENR queries manufacturers, distributors and contractors —Replies uniformly favorable on availability of equipment despite accelerating business boom

Despite the rapidly accelerating boom in construction business throughout the country, there is not and will be no major shortage of construction machinery as indicated by an ENGINEERING NEWS-RECORD survey conducted last week.

That—coupled with the fact that business is very good indeed—was the clearest fact emerging from a spot check of 22 principal machinery manufacturers, plus contractors and distributors.

And business is very good. One company reported it was doubling its production capacity to keep up with the demand. Almost all others reported they were increasing production.

• **What's available**—The survey took up more than 50 individual construction machinery items that contractors might need, ranging from small power units to cranes, shovels and huge earthmoving units including scrapers and trucks.

The scrapers—both hauling and self-propelled—seemed to be hardest to get. Delivery schedules reported ranged from six to 24 weeks. However, one company said tractor-drawn scrapers could be delivered in 2 weeks. All other items are available more quickly from time of placing the order—although there is some variation between individual manufacturers' schedules.

Important items, with their availability (according to the manufacturers) come out this way, in terms of weeks:

Tractors (all types), 3 to 10 weeks; tractor-dozers, immediate to 4 weeks; shovels (up to 1½ yd), 1 to 8 weeks; pavers, immediate to 8 weeks; concrete finishers, 8 weeks; construction mixers, 3 to 8 weeks; truck mixers, 8 to 10 weeks; small pumps, immediate; motor graders, immediate to 4 weeks; rollers, immediate to 3 weeks; crushing plants, 4 weeks; power units, immediate; batching plants, 6 weeks; buckets (all types), immediate to 4 weeks; cranes, 3 to 6 weeks; conveyors, 5 weeks.

• **Not bad**—This situation, say distributors and contractors, is normal and in some cases even better than normal. Certainly it's very good in comparison to the immediate postwar years, when machinery of this kind was available only on a priority basis—and even then with delays that were often up to a year or more.

They pointed out that contractors normally can start jobs without a full complement of equipment, moving it in later as the site is opened up. Thus on new jobs, the contractor can usually make the leeway he may need on equipment delivery.

Secondly, of course, few contractors bid (or are permitted to bid) on contracts for which they are totally unprepared, machinery-wise. Hence the average bidder has still another means of finding the time to get what he needs before he must put the machinery to work.

• **Situation fluctuates**—Actually, of course, the equipment situation changes almost day to day as the construction season moves into full swing. Some manufacturers—conscious of a blossoming buyer reluctance a year ago—may have curtailed production to an extent for fear of growing inventories on their dealers' floors. Certainly, income statements for 1949 showed sharp drops and evidence of a buyers' strike by contractors.

But today, nobody seems concerned about that. Backing the optimistic reports of the manufacturers, most distributors said they have worked off their backlogs and are selling new stock. None seem concerned about procurement of replacements. Although all were conscious of a possible dislocation, it was stressed that the biggest push for equipment for this year is coming now and will continue for another two months. "If we can meet it now—and it seems that we can—we won't have any trouble this year," said one distributor quoted by ENR. A majority of the remainder indicated their agreement.

SPEEDS SHORE TRAFFIC—This twin-leaf bascule bridge over Grassy Sound, Wildwood, N. J., is to be open before July 4, and will permit 80 percent of all boat traffic beneath it to pass without opening the bridge. It replaces a drawbridge which had been opened as often as 12,858 times in one year, each opening delaying traffic 10 minutes. It was designed by the Bridge Division of the New Jersey Highway Department, for which Howard, Needles, Tammen & Bergendoff were consultants.

Federal aid for local roads this year included in Chavez' highway measure

Senate Public Works Committee to open hearings next week on road-aid measure—Its terms seen designed to catch votes

Vincent B. Smith
Washington Staff

Hearings on the Senate highway bill, due to begin next week will present an interesting study in politics. The bill—introduced by Sen. Dennis Chavez, chairman of the Public Works Committee—turned out, as expected, to be a catch-all measure designed to snare votes. It goes far beyond the counterpart measure soon to be considered by the House (ENR April 6, p. 23).

The Senate bill offers federal aid to every kind of traveled way from local farm roads to the Inter-American Highway. For existing federal-aid routes including the interstate system it proposes bigger annual authorizations than those approved by the House committee in the Whittington bill. It would authorize $550 million a year of traditional federal aid and $400 million of special assistance to the interstate roads—for fiscal years 1952 and 1953.

• **Provides local-road aid**—The real dynamite in the bill, however, is a proposal to authorize $150 million of federal aid for county roads. To make it more alluring, this county aid would become effective next July 1 and would run until June 30, 1952. Legal and physical difficulties would make it impossible to extend local road aid on this schedule even if it were enacted, but the enticement of quick benefits apparently overrode practical considerations.

In an election year, it will be hard for the Public Works Committee and for the Senate itself to turn down these allurements. Ordinarily, Sen. John L. McClellan, chairman of the subcommittee which will conduct the hearings, could be counted upon to hold his group to a steady course. But this year, vote getting but may prove too tempting to resist.

If the Senate should vote to authorize federal money for use on local roads, the proposal would still have to top two additional hurdles before it would go to the President. The first test would come in the conference committee that would have to iron out differences between the bills passed by the two houses.

No money for local roads is included in the present House bill. Presumably the House will pass that bill pretty much as it stands. Under those circumstances, the House conferees could not even consider putting local road aid in the conference report that they would have to take back to their chamber.

Should a deadlock ensue, with the Senate holding out for local roads, the only alternative would be to have an amendment offered in the House. If the House approved such a local road amendment, the conferees then could work out an agreement on the item for acceptance by both branches.

This chain of events is not likely to occur. In the light of the difficulties, there is small chance that the farm bloc can force through this year any federal aid for local roads. But the potent is clear.

• **Has been tried before**—Various attempts have been made in Congress during the last dozen years to put the 2,000,000 miles of local rural roads under the federal-aid blanket that now covers 625,000 miles on the primary and secondary systems. Heretofore, these attempts have taken the form of separate bills or amendments to federal-aid legislation. The Chavez bill is believed to be the first general highway measure that has included a proposal to give federal money to farm-access roads carrying low volumes of traffic.

Under the Chavez proposal, the federal government's $150 million would pay 40 percent of the cost of new construction on these roads. It would be matched by state funds for 25 percent of the cost and by local funds for 35 percent. The federal contribution would be limited to $4,000 a mile, apparently making the maximum construction cost $10,000 per mile.

To be eligible for aid, the bill would require a county or a number of counties not exceeding five in a group—to employ a qualified highway engineer or "technician." Design and construction standards would be set by the counties in consultation with their state highway departments, without any stipulated federal supervision. Construction contracts, however, would be awarded by open, competitive bidding, subject to the approval of the Bureau of Public Roads.

• **Keeps matching ratio**—For the interstate roads—40,000 miles of trunkline routes included in the primary system—the Chavez bill ups the annual aid to $400 million but holds the matching ratio to 50-50. The Whittington bill proposes $700,000,000 and would allow this money to be used with primary system aid to increase the federal share on interstate projects in any proportion from 50 percent to 75 percent, at state option.

Both bills agree on this important new principle: States could issue bonds to speed construction of their interstate projects and use future federal interstate allotments to retire the bonds at maturity. This device is counted upon to reduce the pressure on the states to build toll roads with bond money, in order to catch up on their direst needs. The Chavez bill omits one safety clause contained in the Whittington measure. That Congress is under no obligation to continue special interstate allotments in future highway acts.

The Senate bill would apportion its $550 million of regular federal aid on the present 45-30-25 percent basis. In addition, it would authorize $50,000,000, with no time limit, for up to 100 percent federal expenditure on defense highways leading to military installations or industrial plants.

• **Alaska included**—Senator Chavez also proposes in his bill that Alaska shall share in federal-aid highway funds. As a corollary, it would transfer from Interior Department to the Bureau of Public Roads, effective next July 1, the functions and authority for construction and maintenance of roads, bridges, ferries and tramways in Alaska. Two years ago, Interior favored this change. Since that time, it has built up an Alaskan highway organization, and the department now is expected to oppose the transfer.

Six states join appeal for water pact rehearing

Legality of West Virginia's participation in the Ohio River Valley Water Sanitation Commission may be taken to the U. S. Supreme Court for determination if the West Virginia Supreme Court continues to deny it.

That was the agreement of attorneys generals of six member states after a meeting last week (ENR April 20, p. 27), which followed the state court's decision against permitting West Virginia funds to be paid ORVWSC. Attorney General H. S. Duffy, of Ohio, announced the plan.

Officials of the participating states will join in a request for a rehearing by the West Virginia Court. But Attorney General W. C. Marland, of West Virginia, reminded them of the state court's rule against rehearing any case in which the supreme court has original jurisdiction. Even so, he indicated, it would be proper for officials of other states to file briefs. Plans for a federal appeal will follow if rehearing is denied.

Action on floodway pledged by engineers

Board of Engineers for Rivers and Harbors to act on Mahoning-Grand River Floodway plea at next meeting

After a three-day hearing in Washington, the Board of Engineers for Rivers and Harbors promised last week to act at its next meeting on the proposed Mahoning-Grand River Floodway project located in the northeastern part of Ohio.

Brig. Gen. John S. Bragdon, chairman, said the next meeting probably will be in June. In the meantime, he said, the district engineer would be asked to submit additional data in support of his recommendation that the project be built.

Bragdon said it would take several weeks to review the testimony before a recommendation can be submitted to the Chief of Engineers for transmission to Congress.

• **Vital for defense**—One of the many proponents who appeared at the hearings—Rep. Michael J. Kirwan, Ohio Democrat—told the board that the water control project is "vitally necessary to national defense." The scheme would cost about $54,000,000, one-third of which would be borne by local sponsors. The project would curb floods and maintain an adequate flow of water in both the Mahoning and Grand Rivers. It has been approved by the Army division engineer.

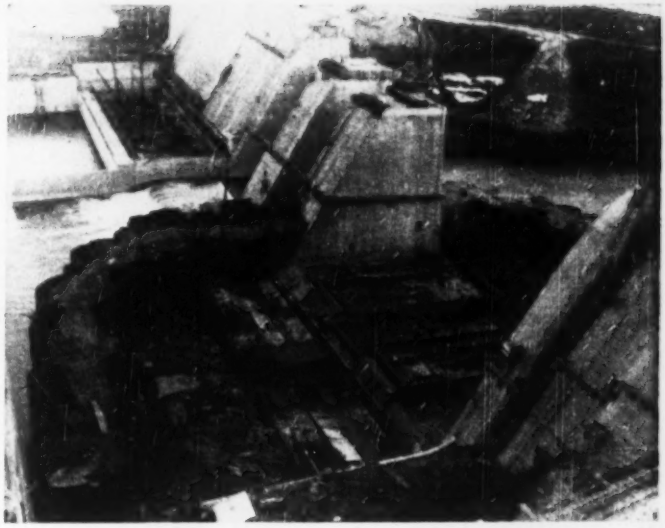
K. M. Lloyd, representing the Ohio River Valley Improvement Association, said lack of water in the industrial centers of Warren and Youngstown "is causing a serious pollution problem."

Mayor Charles P. Henderson, of Youngstown, pointed out that "the area produces 10 percent of the nation's steel, and the whole economy of that region is dependent on a stable water supply."

Opponents of the project contended that it is "part of a piece-meal plan to connect the Ohio River and Lake Erie with a navigable canal."

• **Opposition arises**—Representing the Upper Ohio Valley Association, of Pittsburgh, a former Army general, R. G. Breene, Dayton, Ohio, testified that the Army Engineers drifted far afield from Congressional direction in their report. The witness claimed that the project was "merely a scheme to secure an adequate water supply for the Youngstown-Warren area" and that federal taxpayers were being asked to foot a bill which "is local in character to the extent of at least 90 percent of the benefits."

He also attacked the Army Engineers' use of a "conceivable flood" in estimating benefits.



Creek Dam on Cumberland River, Kentucky. 1,400,000 cu yds of concrete will be used in the spillway powerhouse section and adjacent non-overflow sections. Work is being done under the supervision of the Nashville, Tenn., district Corps of Engineers by Jones-Wright Company, Charlotte, North Carolina. (Corps of Engineers Photo.)

USDC publishes standard bridge study

A study released last week by the Office of Technical Services, Commerce Department, describes a standardized bridge design for temporary or permanent construction in these lengths: Beam spans of 20 and 24 ft; pony truss spans of 40 to 200 ft, and—as a stiffened suspension bridge—clear spans of 160 to 640 ft.

Carried out by the Corps of Engineers, the study undertook to arrive at a variable-span design for military use that would strike possible stocking of standard parts for the building of beam spans, pony truss spans, piers, towers and pile bents.

The recommended design is a simple, elemental structure, with sufficient strength to carry 50-ton tanks and railway loadings not exceeding Cooper's E-20. With the addition of special parts to anchor the cables to the trusses, the suspension bridge may be built as a self-anchored design.

The suspension bridge includes suspension members of prestressed galvanized strands to be stocked in as few sizes is possible—one end of each strand to be socketed in the shop, leaving the other end for field-placement. A laminated wood floor is proposed.

Unstiffened suspension bridges were rejected for the purpose of the variable-span design because the passage of traffic would be impeded by the disconcerting effect of excessive transverse rotation and vertical deflection. "Cable-stiffened" suspension bridges failed to meet the requirements of the desired design for efficiency and economy of construction.

Titled PB 97471, Variable Span Suspension Bridge, Preliminary Study, the 106-page report, including drawings, graphs and tables, is available at $13.75 in photostat, $4.50 in microfilm. Orders should be addressed to the Library of Congress, Photoduplication Service, Publication Board Project, Washington 25, D. C., accompanied by check or money order payable to the Librarian of Congress.

Dispute road consultants

Ohio's Highway Director T. J. Kiner and State Auditor Joseph T. Ferguson are disputing whether the highway department legally may hire outside engineering help. Ferguson has withheld approval of contracts calling for $445,000 in engineering fees to non-departmental personnel. Kiner asserted the attorney general had approved such contracts and that the department is short of engineering help.

Army names three division engineers

Maj. Gen. Lewis A. Pick, Army Chief of Engineers, announced appointment of three new division engineers last week to fill vacancies in the corps' decentralized field organization.

Col. F. L. Frech, now assigned to the First Army, at New York City, and former district engineer at Philadelphia, will become division engineer, North Atlantic Division, New York, about June 10.

Col. Arthur W. Pence on June 1 will become division engineer of the Ohio River Division, at Cincinnati, Ohio. He now is district engineer at Nashville, Tenn.

Col. John S. Seybold, now assigned to the Omaha, Neb., Missouri River Division office, and former district engineer of the Garrison District, at Bismarck, N. D., will become division engineer of the South Pacific Division, at Oakland, Calif., about May 8.

The North Atlantic Division, embracing an area of approximately 125,000 square miles, includes all of two states, New Jersey and Delaware, and parts of nine other states: Vermont, Massachusetts, Connecticut, New York, Pennsylvania, Maryland, West Virginia, Virginia and North Carolina. There are five districts under the division: New York, Philadelphia, Baltimore, Washington and Norfolk.

The Ohio River Division embraces an area of approximately 206,000 square miles and includes parts of 14 states: Illinois, Indiana, Kentucky, Ohio, Pennsylvania, New York, Maryland, West Virginia, Virginia, North Carolina, Tennessee, Mississippi, Alabama and Georgia. Under the division are four districts: Huntington, Louisville, Nashville and Pittsburgh.

The South Pacific Division is the largest in area of all the Army Engineer divisions. It embraces approximately 566,000 square miles and includes all of two states, California and Arizona, and parts of seven: Oregon, Idaho, Nevada, Utah, Wyoming, Colorado, and New Mexico. There are three districts under the division: Los Angeles, Sacramento and San Francisco.

3 Montana road officials resign; charges withdrawn

Attrition in Montana's Highway Department reached its peak last week when three members of the commission resigned, effective May 1, after an ouster hearing at which Gov. John W. Bonner withdrew charges he had filed against them.

The resignations were the latest action in a series of convulsions which in two months have brought the resignation of Highway Engineer C. H. Stahl, ENR March 9, p. 21; abolishment of two engineering jobs, and the dismissal of Commission Secretary W. O. Whipps and attorney Myles J. Thomas.

Bonner demanded the resignations of Commissioners Lee Ford, chairman, H. H. Kincaid and A. W. Heidel. In doing so, he charged that they permitted the ordering of materials without obtaining bids; that they refused to cooperate with the governor; that they failed to adopt a specific road plan they should have adopted; and that they refused to cooperate in the ousting of Whipps.

In withdrawing the charges at the hearing, Bonner declared them innocent "of any unlawful misconduct in office, or of any willful wrongdoing." He added that they had not been responsible for the approval of the materials order without bids and that the materials had not been bought despite approval of the order.

HE'S GOT EVERYTHING—The Mutual Life Insurance Co. of New York moves to this building at Broadway and 55th St., May 1. With 421,000 sq ft of floor space, the structure was built by the Turner Construction Co. Shreve, Lamb and Harmon Associates were architects. The building will be air-conditioned, will have automatic elevators and will be lighted entirely by fluorescent lamps. A public address system will be installed throughout, and radiant heating will be installed in pavements around the building. The building will be soundproofed throughout and will contain off-street truck loading facilities. Movable steel partitions will be used for interior walls.

British Columbia sets 7-year road program

$120 million expenditure planned—Location of Trans-Canada Highway route through province announced

A seven-year, $120-million highway construction program has been approved for British Columbia by the provincial legislature. And selection of the Trans-Canada Highway route through the province has been announced.

The Trans-Canada highway, under agreement with the Dominion government, will go from Banff, Alberta, via Kicking Horse Pass, Big Bend Highway, Revelstoke, Kamloops, Fraser Canyon, Vancouver and Nanaimo to Victoria, a ferry link joining Vancouver and the Vancouver Island section beginning at Nanaimo.

• **$29 million from Dominion**—The Dominion government will provide about $29,000,000 as its share of the highway; the provincial government has budgeted $24,000,000, with another $4,5,000,000 for land and fencing.

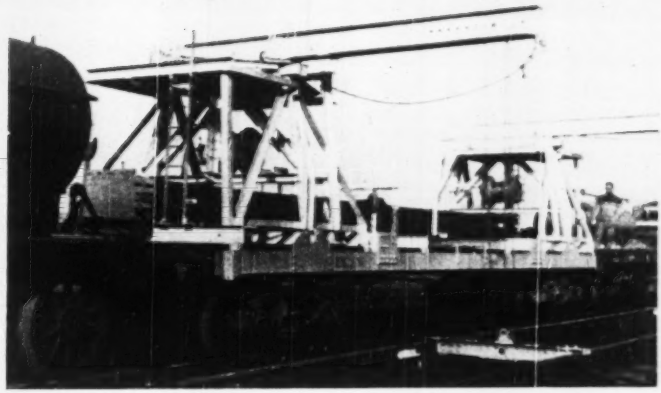
Borrowing a total of $86,000,000, to be repaid by 3 cents of the 10-cent provincial gasoline sales tax, was authorized by the legislature. Also, the government has available another $5,000,000 authorized by the House last year.

In addition to the Trans-Canada Highway, the funds will allow completion of the paving of the Southern Trans-Provincial Highway from Vancouver to Crow's Nest Pass; completion of paving of the Island Highway on Vancouver Island; completion of the Okanagan and Kamloops-Vernon highways; completion and paving of the Fraser Valley Highway on the north shore of the Fraser River, and improvement of feeder and secondary roads.

• **Numerous bridges planned**—For the coming year, the government has allocated $3,300,000 for paving 280 mi of highways, and $10,000,000 has been allocated for new construction on main projects. Construction of 22 bridges is planned this year, in addition to completing the $4,000,000 program undertaken by the government last year.

Public Works Minister E. C. Carson, in detailing the program, announced also that John Hart Highway, linking Prince George and Dawson Creek, is scheduled to be completed in 1951.

The public works department annual vote provides $8,917,630 for maintenance and repairs to roads, bridges, ferries and wharves, compared with $8,500,000 last year for maintenance of these facilities.



BRITISH LIKE IT—A track re-laying device for use on double track, developed by the Southern Region, British Railways, about two years ago, has proved so successful that three more have been added. Working on a parallel track, the machine first picks up an unbolted 60-ft section of old track, with ties still attached, moves ahead and puts the section on empty flat cars standing on the track from which the section has been lifted. Then it moves on to other cars on the same track which carry newly assembled 60-ft sections of new rail and ties, picks up one of these sections and carries it back to replace the lifted section. The lifting arms are pivoted so that they can be swung clear of the parallel track when not in use.

New USPHS survey reveals much untreated sewage reaching streams

Discharge from homes of 25 million people untreated—Only partial treatment for discharge from homes of as many more

Sewage wastes from the homes of 25,000,000 people discharge directly into public waterways without treatment, Assistant Surgeon General Mark D. Hollis said last week following a meeting at Washington of the National Water Pollution Control Advisory Board.

Wastes from homes occupied by another 25,000,000 people are only partially treated, Hollis said. These figures, he explained, are taken from a new supplement (213) to "Public Health Reports."

This supplemental document, "Statistical Summary of Sewage Works in the United States," he added, was prepared by John R. Thoman, sanitary engineer at the PHS Environmental Health Center, in Cincinnati. In it, Thoman has summarized basic data that first appeared in the 1945 inventory of water and sewage facilities, a PHS survey covering all communities of over 100 population in the United States. "There has been no significant change in the general situation since the survey," Hollis said.

• **Half have sewers**—According to the summary, some 40 percent of the 22,400 communities listed five years ago—8,917, to be exact—were equipped at that time with sewer systems. Those systems served about 54 percent of the total population of the country.

Three areas in the country surpass the national average of 62.7 percent for the sewer-connected population whose wastes are treated in sewage treatment plants, according to the supplement. Those areas are the east north central states (Ohio, Indiana, Illinois, Michigan and Wisconsin), the west south central states (Arkansas, Louisiana, Oklahoma and Texas), and the Pacific coast states (Washington, Oregon and California). Together, they hold slightly more than one-third of all the people whose homes are connected with sewers.

• **Many not connected**—In a few scattered states—Arizona, Illinois, Maryland, Nevada, New Mexico, Texas and Wisconsin—homes of 9 out of 10 persons are connected with systems which include sewage treatment. The proportion is nearly as high—4 out of 5 persons—in the east north central states. This group of states contains nearly 20 percent of the total population that is served by sewer systems.

Going back 90 years, the report shows that, in 1860, the home of only one person out of 50 was served by a sewer system; today the ratio is one out of two. By way of explanation, in 1860 there were only 10 communities with public sewerage systems. Today, there are nearly 9,000. But not all the people in these communities are served by the systems installed, the report declares. Continually since 1860, the number not served in sewered communities has ranged between 5,000,000 and 8,000,000.

In the 15 years from 1930 to 1945, more than 3,800 communities installed sewer systems, the report says. These installations increased the total number of systems by 75 percent, but there was not a corresponding increase in the number of persons served. This lag points to the need for additional sewer systems in the smaller communities, the summary concludes.

Between 1940 and 1945, 401 new installations brought sewer facilities to more than 4,000,000 people not previously served, the report asserts. By 1945, practically all communities of more than 10,000 population and about 91 percent of those in the 5,000-10,000 group had sewer systems. By contrast, less than 18 percent of the communities under 1,000 population are connected to sewer systems.

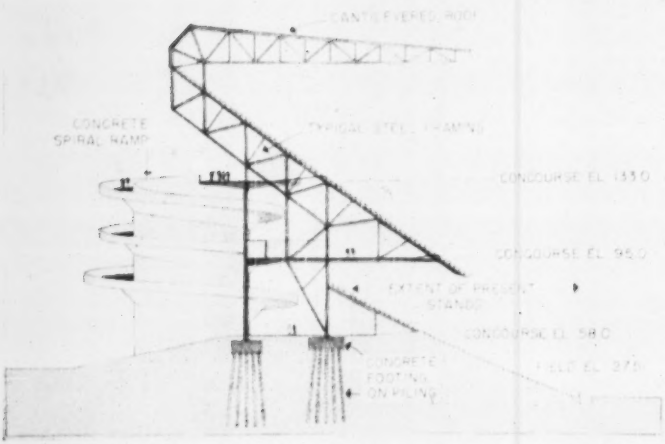
Information for the 1945 inventory was compiled with the help of the state health departments, the report makes clear.

Two gas, chemical plants to be built in Kentucky

Tennessee Gas Transmission Co. will build a $12,000,000 extraction and recovery plant at Greensburg, Ky., adjacent to its pipeline network.

It will be designed to process more than 600 million cu ft of natural gas daily, removing therefrom about 400,000 gal of liquid hydrocarbons daily. These will be sold to the newly organized Matheson Hydrocarbon Chemical Corp. and transported through an 8-in. pipeline from the TGT plant to a new chemical plant Matheson will build on the Ohio River near Brandenburg, Ky. This plant will cost $17,000,000 and is to be complete at the end of 1951. Matheson also plans a $6,000,000 plant for the production of raw material components at an undisclosed location.

Construction of TGT's new extraction plant is to begin within two months. The plant is to be in operation by mid 1951. Facilities will cover a 10-acre site and will employ about 40 people, TGT announced.



BIGGEST WELDING JOB?—This second-deck addition to the University of Washington stadium, at Seattle, is described by university officials as the biggest welding job ever performed on a building structure. Sigmund Ivarsson was consulting engineer and George W. Stoddard architect. Its design will eliminate gusset plates and rivets, saving about 200 tons of steel. Weld stresses will be 33 percent in excess of those recommended by the American Welding Society. Ivarsson says the welding advantages include better appearance, greater strength, saving of several weeks of construction time and $40,000 in steel costs.

AISC meeting hears research reports

Research on high strength bolts, developments in paint for structural steel, and advancements made in lightweight floor construction formed the nucleus of the second annual National Engineering Conference of the American Institute of Steel Construction, at Chicago April 12-13. Some highlights of the panel discussions and papers, include:

• **High tensile bolts**—Improved results will be obtained with the use of high tensile structural bolts, up to 120,000 psi tensile strength, as current research develops new rules for taking full advantage of their properties. They can be used with economy and with improved engineering performance in a variety of structural work. Although conclusive reports are not yet available, four universities are extending their experimental work on high tensile bolts. The University of Illinois has statically tested bolted joints and made fatigue tests on a number of them. Northwestern University is investigating the effect of grip length of fasteners; the University of Washington (Seattle) is studying static slip resistance of bolted joints and Purdue University has begun fundamental studies on the stress distribution in plates adjacent to the hole, due to high clamping forces of bolts.—W. C. Stewart, Technical Advisor, Industrial Fasteners Institute, Cleveland.

• **Railroad Bridges**—An estimated $160,000 can be saved each year by the railroad industry by using high-strength bolts in place of rivets in maintenance work on bridges alone, and a total of $440,000 could be saved yearly if bolting was used for all field connections. This is based on recent figures indicating that about 800,000 rivets are re-driven each year by railroad bridge maintenance crews in the United States, and 1,400,000 rivets are driven during the erection of new railroad structures.—E. J. Ruble, Structural Engineer, Association of American Railroads, Chicago.

• **Painting of Steel**—More research is needed by steel producers and paint manufacturers on paints and painting of structural steel from the standpoints of both economics and performance. In the preparation of steel for painting, there is considerable question as to whether the presence of some mill scale is as objectionable or harmful to paint performance as the presence of metal surface rust. When used as a shop coat primer, Zinc Yellow (a greenish-yellow pigment composed of the double salt of zinc and potassium chromates) is superior as a rust inhibitive to any other pigment available, including red lead. For topcoat paints, the most durable pigmentation consists of aluminum, followed by carbon blacks, red oxides and then grays and greens, ground in alkyd or phenolic resins, spar varnish or linseed oils.—William J. Bradley, Pittsburgh Plate Glass Co., Springdale, Pa.

• **Lightweight construction**—Among the several materials and methods of lightweight construction now available, is one involving lightweight reinforced steel plate for flooring. Already laboratory tested but as yet unused in a building floor, the system includes a 1-in. steel plate, stiffened by zig-zag 2x1-in. bars, and edges reinforced with 3-in. channels—all welded into a structural unit and fire-proofed with lightweight plaster below and fill material above. The assembly weighs 8 lb per sq ft. It has a ratio of dead load to live load of 0.8, and an efficiency rating (live load to total load) of 55%.—Alice H. Bell, engineer, AISC, St. Louis.

International water pact sought for power plant

United States and Canadian representatives are negotiating an agreement to permit the Aluminum Company of America to use lakes just across the Alaskan Border in British Columbia as a power source for an aluminum plant proposed for the Skagway area, in Alaska.

Alcoa has bought property near Skagway and its engineers have surveyed proposed routes for the water, carrying it 35 mi through the Alaskan coastal mountains to tidewater at the head of the Lynn canal. The power plant, which might be as large as the largest hydro plants in the United States, would involve a series of tunnels and dams. These lakes now empty into the Yukon River, which empties into the Bering Sea.

Alumina for the proposed plant would be shipped from the United States to take advantage of extremely low-cost power.

OK Los Angeles freeway

A hotly contested $6,500,000 freeway link to overpass freight yards and a major boulevard in the northern portion of downtown Los Angeles has been approved by the city council.

Council members rejected protests of bypassed businessmen and authorized negotiations with the State Highway Commission for construction which would provide a 1-mi expressway linking two freeways.

Engineers informed the council that funds for right-of-way acquisition were available and that further appropriations for the project are expected to be in the next highway budget.

Willamette Basin job pushed by Engineers

Lookout Point Dam work goes into high gear near Eugene, Ore.—aggregate plant erected for Detroit Dam

With the awarding of two contracts for railroad and highway relocation and track laying, construction work on Lookout Point Dam has gone into high gear. The dam is a unit of the Willamette Basin flood control, power, navigation and irrigation project in western Oregon.

A $2,846,611 contract for relocating the Southern Pacific Railroad and Oregon State Highway 58 for a distance of 4½ mi at the dam and reservoir site, on the middle fork of the Willamette River 25 mi west of Eugene, was awarded to Guy F. Atkinson Co. Utah Construction Co. received the $672,760 contract for laying 8 mi of railroad track.

• **Detroit plant readied**—On another unit of the project, Detroit Dam on the North Santiam River 49 mi east of Salem, an aggregate plant which will provide gravel for concrete and other work is being constructed, preparatory to concrete pouring on the dam itself. More than 40 tons of trusses and other steel were trucked from Portland, Ore., to the Detroit damsite to form the framework for the aggregate plant.

Lookout Point and Detroit Dams, fourth and fifth units of the Willamette project, together will cost more than $125,000,000. They are key units in the basin project, which eventually will embrace 19 stategic dams and cost an estimated $432,000,000. Lookout Point, an earth fill dam, will store 456,000 acre ft of water and will have a power production capacity of 115,000 kw. It will cost about $74,800,000.

Detroit Dam will create a reservoir holding 455,000 acre ft of water and will have power production capacity of 100,000 kw. It will cost nearly $70,000,000.

• **Big Cliff to follow**—In connection with the Detroit project, a re-regulatory dam, known as Big Cliff, will be built downstream from the main structure. It will be only 182 ft high, compared with Detroit's 463, and will have a power plant capacity of 18,000 kw.

Three dams in the big project—Fern Ridge on the Long Tom River, Cottage Grove on the coast fork of the Willamette, and Dorena on Row River—have been completed at a cost of $21,291,000. Other units, still in the planning stage, are slated for location on South, Middle and North Santiam Rivers, the middle fork of the Willamette, the McKenzie, Calapooya, Tiumtum and Little Luckiamute Rivers; on Hills and Fall Creeks, and Waldo Lake.

The entire project is being constructed under supervision of the Corps of Engineers.

CARR MOVES TO CHICAGO

J. Roland Carr, associate editor of *Engineering News-Record* in Cleveland since early 1947, will make his headquarters in Chicago after May 1, continuing as regional associate editor of the paper. He had operated from Chicago from March, 1943, when he joined ENR, until his transfer to Cleveland. Before joining ENR, Carr had served three years each with the Kentucky Highway Department and the American Bridge Co. in bridge design, and 11 years with the Wyoming Highway Department, also in bridge design. His headquarters in Chicago will be in the McGraw-Hill Building, 520 N. Michigan Ave., whence he will cover 24 states from Pennsylvania to the Rockies.

Los Angeles smog control grows rapidly in 2 years

On the second anniversary of the Los Angeles Air Pollution Control District, Gordon P. Larson, director, reported air-smog installations built during the period cost a total of $12,721,755.

Pointing to the stepped-up pace of air-pollution control, Larson said 153 applications for the construction of control equipment were received during March. In addition, he said 148 pieces of smog control equipment were under construction on April 1.

Speaking of the aggravated smog condition prevalent in the county, Larson declared: "Gains in the battle are being made, but a long uphill pull remains ahead."

Meanwhile, after more than a month of investigation, the Los Angeles County Board of Supervisors has set up a $50,000 fund to pay for the importation of seven air pollution experts from the U. S. Bureau of Mines to assist county smog investigations in the analysis of eye-irritants in southern California air.

The final contract was a watered-down version of one originally offered by Dr. Lewis McCabe, now of the Bureau of Mines and formerly smog control chief of Los Angeles.

The first plan offered the supervisors was for a 20-man team from the federal bureau to make a $100,000, six-month study.

McCabe later agreed with the board's findings that 20 visiting technicians would crowd existing facilities.

Decision this year on Nechako damsite

Aluminum Company of Canada seeking location for 1,500,000-hp hydro-electric plant for aluminum works

The Aluminum Company of Canada will determine this year whether a feasible damsite can be found on the Nechako River, in the Tweedsmuir Park area of north-central British Columbia. A 1,500,000-hp hydro development in the area would feed a proposed $500-million aluminum refinery project, said McNeely Dubose, vice president of Alcan.

Dubose, in Victoria, B. C., to discuss terms of a water rights agreement with the provincial government, said that Kitimat, near Terrace, is the most favored site for the projected plant. Problem of construction of the power line from Kemano River, site of a proposed power house, over 50 mi of mountainous country, to Kitimat, however, may not be resolved for some time, he said, because of difficult terrain.

• **Difficult transmission**—If the transmission line follows the shoreline to Kitimat, it must be carried around or over sheer cliffs; inland it must go over or circumvent high mountains. Air surveys last summer disclosed a pass that might be suitable for the power line but further groundwork is essential before the route can be listed as satisfactory.

Despite British Columbia's worst winter on record, Alcan's survey in the Tweedsmuir Park area has been going on, and is continuing.

A crew under Frank Calder, Alcan hydro engineer, has been measuring and gauging river flow and weather conditions. Metering equipment has been supplied by the Dominion Water and Power Bureau, and the survey generally is under direction of C. J. Webb, district engineer.

• **Drilling resumed**—Drilling and work necessary to prove up a suitable damsite was halted during the winter, but is being resumed. Last year one damsite proved unsuitable because of the depth of bedrock on one side of the Nechako. This year it is expected engineers will test a site below the Nechako Canyon, which would involve a somewhat higher dam to obtain the same water level in the lakes above. Another alternative likely to be examined involves construction of two dams, one on the Ootsa River, the other at the end of Tetachuk Lake, which would provide the same storage basin.

Mr. Dubose has been in France, Norway, Italy, Spain, Switzerland and Britain during the winter studying power developments there.

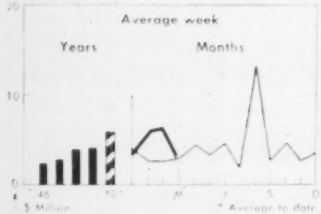
CONSTRUCTION BUSINESS

Waterworks contracts will set record

Municipalities are contracting waterworks projects at a record rate this year; by year's end, contract volume will have set an all time high.

• **So far this year**—Contracts through April 20 total $80 million, an average of $5 million a week. That is 85% above last year.

Waterworks



A few states account for a big share of this volume. Texas has averaged $2 million a month; elsewhere, large individual projects include a $5.3 million transmission main in Chester, Pa.; the $5.6 million Northeast Water Tunnel at Detroit; and the $17.9 million Downsville Dam in upstate New York.

• **Outlook for the rest of 1950**—The outlook this summer is for contained high volume.

Some of the larger programs that will probably reach the contracting stage this year are Chicago's $75 million development; Baltimore's major expansion program—$19 million of bonds were sold this month, and $22.5 million more will be voted on in the November elections; Mobile, Ala.—getting under way on a $7 million water supply program; and Detroit, with about $6 million more contracts to be let this year.

The postwar demand is as pressing as ever, in spite of $6.6 billion of waterworks construction contracted since the war's end. The backlog of proposed work continues to grow.

• **Backlog**—ENR's backlog of proposed waterworks construction is now $1,350 million. That's enough to support six year's construction at last year's rate of contract awards.

The backlog dropped off $6 million in March, as more projects were contracted than proposed in that month. But, in spite of the record volume of contracts this year and last, the backlog has gained $131 million since January 1; that's because of the $140 million Cannonville dam proposed by the New York City Board of Water Supply. During 1949, the backlog rose only $50 million, as the planning pace slowed down and actual construction continued at the record high level of 1948.

Waterworks backlog by regions has shown these trends since January 1: New England up 9%; Middle Atlantic up 36%, but excluding the Cannonville dam, it is down 8%; South, no change; Middle West up 2%; West of Mississippi up 2%; and Far West up 2%.

About 75% of waterworks projects contracted this year and last came out of the backlog. The rest were put under contract without previous listing as proposed work.

Performance targets for construction businesses

The Accounting Corporation of America has set up a Barometer of Small Business, a service to contractors and materials and equipment companies. It shows operating statistics of the more efficient companies in each type of business.

It compiles monthly operating figures from statements of 65 general contractors, 47 lumber and building materials retailers, 52 plumbing and heating companies, 94 hardware stores, and 38 paint, glass and wallpaper stores.

Lumber supply still lags behind orders

New orders for lumber ran 10% ahead of production in the first week of April. This is the same pattern that prevailed in March.

Although production is increasing, supply still lags behind the record demand. Production the first week in April was 5% above last year, and orders were up 16%.

"Light supply at the distributor level" cannot be relieved quickly by greater mill production. Shipments by the mills so far this year have been 15% higher than current production. This has drawn down softwood stocks, so that they are now equal to 44 day's production, compared with 54 days a year ago.

"But production is rising slowly to meet the big demand. Lumber production in March was 7% above last year and 4% above 1948.

Cost of living turned up 0.3% in March

The cost of living in March was 0.3% higher than February. This up turn reverses the slow downward trend of the past year.

But the March index, at 167.0 (1935-39 = 100), is still 1.5% below a year ago. The Bureau of Labor Statistics computes the index as of the 15th of each month.

A 0.6% rise in the food price index accounted for most of the increase in the total index.

Workers in gun battle over moving materials

A long-smoldering feud between carpenters and laborers exploded into a blazing gun battle last week on a St. Louis construction site.

Police said the shooting was over who should move lumber and other materials on the construction job.

Wage settlements—

• **Detroit**—Some 15,000 Detroit building trades workers will get wage boosts of 10½-12½ cents an hour, effective May 1.

Unskilled laborers are up 12½ cents to $1.80; bricklayers and stone masons are up 12½ cents to $2.75; semi-skilled laborers get $1.88; mortar mixers $1.93 and sewer workers $2.03.

• **Akron**—Carpenters, painters, laborers and plumbers and steamfitters in Akron, Ohio, have signed one-year agreements giving pay increases of 7½-12½ cents.

The new contracts cover 3,500 workers in Summit and Medina Counties. These rates run from 20 to 32½ cents lower than in nearby Cleveland and Cuyahoga Counties.

Carpenters receive a 12½ cent increase to $2.37½ an hour. Common laborers to get a 10 cent rise to $1.65. Plumbers and steamfitters are up 7½ cents to $2.44, and painters are up 7½ cents to $2.12½.

• **Boston**—Sheet metal workers and roofers in Boston will get a welfare fund the first in the area. A 4% payroll tax will provide life insurance and hospital care and accident and health protection for workers on the job. Cost is set at 10 cents hourly.

• **New London, Conn.**—Bricklayers have signed a contract continuing the present wage rate of $2.50 an hour until April 1, 1951.

The contract also calls for payment by the employers of seven cents of each man's hourly pay into the welfare plan of the AGC State Building Trades beginning May 15.

BIDS AND BIDDERS

(Major project news received after Construction Reports, page 78, went to press.)

Lookout Point Dam—Morrison-Knudsen Co., Inc., Boise, Idaho, was low bidder at $18,699,051 for completing earth embankment, dam structure, and constructing concrete spillway for Lookout Point Reservoir, on Middle Fork, Willamette River in Oregon when U.S. Engineers, Portland, opened bids April 20. Engineer's estimate is $18,980,375.

Homes—Arthur B. McBride, Cleveland, plans residences in Bay Village O. Estimated cost is $8,750,000 for the housing project.

Stripping Plant—Stone & Webster Engineering Corp., Boston, Mass., will design and construct stripping plant to extract by-products from natural gas at Gabe, Ky., for Tennessee Gas Transmission Co., Nashville, Tenn. Estimated cost will be from $9,000,000 to $12,000,000.

Military Housing—Cropsey Construction Corp., New York, N.Y., has been selected as sponsor to construct, manage and finance garden apartment at Hempstead, N.Y., for Mitchell Field personnel under the Wherry Act. The project will cost about $5,000,000 and owner will construct with own forces. Oscar Silverstone, Brooklyn, is architect.

Generators for Chief Joseph Dam—Westinghouse Electric Corp., Seattle, Wash., was low bidder for supplying four generators for Chief Joseph Dam, near Bridgeport, Wash., at $4,227,100. U.S. Engineers, Seattle, opened bids April 18 at Seattle.

Replacing Gas Feed Lines—Chattanooga Gas Co. awarded contract for replacing gas feed lines and converting to natural gas in Chattanooga, Tenn., to Stem Construction Co., Nashville, at about $3,000,000.

Sewers—City of Hamilton, Ont., plans constructing trunk sewer in Mountain Township to cost about $3,500,000. Proctor, Redfern & Laughlin, Toronto, are consulting engineers.

Military Housing—Bueco Corp., Fort Worth, Tex., was low bidder for proposal to manage, finance and construct housing at Carswell Airforce Base, near Fort Worth, at $4,700,000, when Department of Air opened bids.

Pulp and Paper Mill Additions—Mac Laren Co., Ltd., Buckingham, Que., plans pulp and papermill addition to cost about $2,000,000, at Buckingham, Que. Standler, Hunter & Co., Montreal, are architects for the mill project.

Road and Bridge—Pennsylvania Highway & Bridge Authority, Harrisburg, Pa. awarded contract for divided highway in Erie County to Baldwin Bros. Paving Co., Cleveland, O., $2,552,136, and for bridge over Monongahela River to Fort Pitt Bridge Works, Pittsburgh, $2,007,145. S. P. Longstreet is engineer for Authority.

Apartments—The Chesapeake Gardens, Baltimore, awarded contract to Henry A. Knott, Inc., Baltimore, for 54 garden type apartments in Aberdeen, Md., to cost about $5,000,000. Shreve, Walker & Associates, Detroit, Mich., and Cyril H. Hebbink, Baltimore, are architects.

Airport Improvements—M. A. Gammino Construction Co., Providence, R.I., has been awarded contract at $1,197,116 for runways, taxiways and other improvements at Theodore Francis Green Airport, Warwick, R.I., by State of Rhode Island, Providence.

School—State of Connecticut, Hartford, plans constructing auditorium at Bullard Haven Technical School, Bridgeport. Estimated cost is $3,395,000. Frederick J. Dixon, Bridgeport, is architect.

Bridge Superstructure—Pennsylvania Turnpike Commission, Harrisburg, awarded contract superstructure bridge over Allegheny River, to carry western section of Pennsylvania Turnpike, to American Bridge Co., Philadelphia, Pa., $2,135,576.

Apartment—Irving Kaskel, Brooklyn, N.Y., will construct apartment in Brooklyn with own forces. Estimated cost $2,500,000. Philip Birnham, New York, N.Y., is architect.

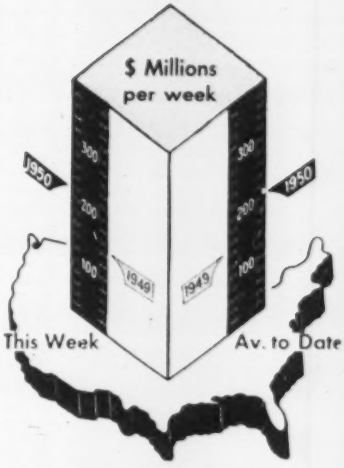
Canal Improvements—Bureau of Reclamation, Tracy, Calif., received low bid for earthwork, concrete, lining and structures for Delta-Mendota Canal in California: Schedule 1 from A. Diechert & Son, Sacramento, Calif., $427,139 and schedule 2 from Haas & Rothchild, San Francisco, Calif., $1,107,755.

Hospital—Le Bonheur Children's Hospital, Memphis, Tenn., will take bids May 29, for the construction of hospital. Estimated cost is $2,000,000. J. Gringer Smith, Inc., Memphis, is architect.

COSTS AND VOLUME

ENR INDEX NUMBERS

Index Base	1913	1926
Construction Cost	Apr. 20 491.94	236.47
Building Cost	Apr. 20 262.78	196.11
Volume	Mar. 20 351	154



Activity This Week

As reported to ENR (in millions of dollars)

Amount of contracts let

	Week of Apr. 27 1950	Cumulative 1950 (17 wks.)	Cumulative 1949 (17 wks.)	% chge
Federal	$68.8	$470.9	$362.7	+30
State & Mun.	84.1	955.9	877.7	+13
Total Public	$94.9	$1,166.8	$1,240.3	+18
Total Private	124.2	2,053.2	1,221.8	+64
U. S. Total	$219.1	$3,480.2	$2,462.1	+41

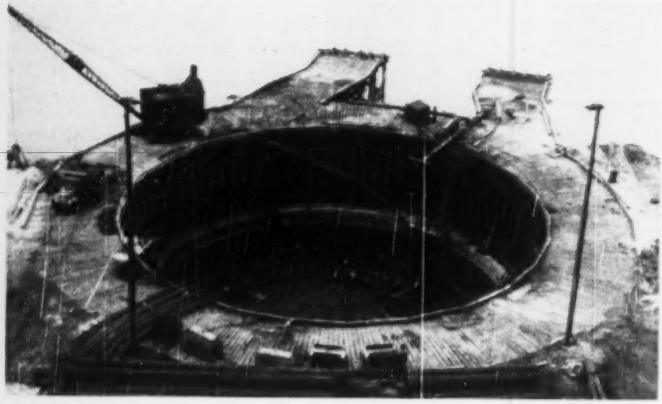
Contracts by type of work

	This Week	Cumulative 1950 (17 wks.)	Cumulative 1949 (17 wks.)	% chge
Waterworks	$3.6	$83.6	$42.0	+99
Sewerage	7.6	54.1	77.5	−31
Bridges	8.9	155.8	109.2	+43
Highways	29.3	237.4	189.7	+25
Earthwork, Waterways	4.9	128.7	203.1	−36
Buildings:				
Public	28.4	626.7	531.4	+18
Industrial	27.0	354.6	339.7	+4
Commercial	89.1	1,493.3	773.4	+93
Unclassified	1.5	251.6	185.1	+36

NOTE: Minimum size projects included are: Waterworks and waterway projects, $25,000; other public works, $50,000; industrial buildings, $65,000; other buildings, $250,000.

New capital for construction

	Cumulative 1950 (17 wks.)	Cumulative 1949 (17 wks.)	% chge
Corporate Securities	$595.2	$844.4	−29
State and Municipal:			
Excl. Housing	612.8	599.1	+2
Housing	198.8	215.4	−7
Total Capital	$1,406.8	$1,658.9	−15



UPPER WALE in place for Venice, Ill. power plant intake pumpwell; lower wale formed for concrete placement. Note steel-pile wale supports.

Concrete Cofferdam Wales Give Maximum Work Space

F. L. Jenkins,
Vice-President, Western Foundation Corp., New York, N. Y.

BRACING a 97-ft dia. open sheetpile cofferdam with circular concrete wales permitted unobstructed work on a pumpwell for a condensing-water intake. Work was part of an extension at Union Electric Power Company's plant in Venice, Ill., just across the Mississippi River from St. Louis. The cofferdam, of Z sheet piling, had only two wales to hold it against a 55-ft differential head of earth and water.

And construction of the 250-ft intake itself featured: (1) Assembly of steel pipes in a frame above the water, and (2) lowering 40- to 50-ft sections of this assembly 50 ft in a wet cofferdam, for concreting and permanent connection. All of the structure rests on H-section-core caissons socketed in bed rock.

Condensing water for the original plant is supplied through a pumpwell that was sunk as an open-dredged caisson. Difficulties in sinking this caisson, included buried trees and other obstructions that caused serious tilting and required great ingenuity in chopping and excavating to avoid use of compressed air. When the job was finished there was some doubt whether this first pumpwell was firmly set on rock.

For the current addition to the plant it became essential to provide

MUCKING INSIDE THE CIRCULAR COFFERDAM—After the two concrete wales had been formed and cast in place and the caissons were set below final bottom level, water was readmitted into the pumpwell area. A floating dredge was then able to remove a 40-ft sand bed; a crushed-stone layer was placed before tremie concrete base. Reinforcing steel and diaphragm forms for sectional tremie-seal concrete can be seen at left; trestle for intake at right.

additional cooling water by construction of a new intake and pumpwell. And it was possible to steer construction procedures around the difficulties revealed by the earlier experience.

Subsurface materials at the site are river sand and silt to a depth of about 80 ft. Boulders and gravel overlie hard limestone rock that is somewhat weathered in the top few feet.

The area selected for the pumpwell construction was at one time the site of a mill and a ferry landing. A number of wood piles stood in the ground, and sunken barges were known to lie adjacent to the site.

Selected contractors were asked to present proposals for construction of the pumpwell and intake. Spencer, White & Prentis, Inc. and Western Foundation Corp., with their subsidiary, Drilled-In Caisson Corp., collaborated on the plan that was adopted.

The pumpwell cofferdam had its top at El. 50, bottom of pumpwell, El. 32, rock, El. 53, and maximum recorded high water is El. 45. (As anticipated, the cofferdam did flood during the job, but without damage to the work, other than a certain amount of delay.)

Sheetpiles for the cofferdam were Z-section, driven to 4 toe hold in a boulder formation 10 ft below the planned excavation level.

• **Wale design**—Wales were designed as circular beams 4 ft high, with an effective depth of 4 ft 6 in. The center of the top wale was at El. 6 (24 ft below the top of the sheetpiles). The center of the lower wale was 14 ft below the upper, about 24 ft above the bottom of the tremie seal.

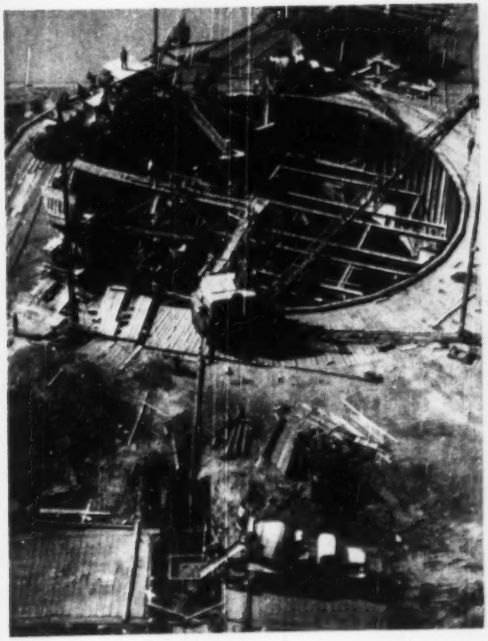
These concrete beams were heavily reinforced, having twelve 14-in. square bars continuous at 3 and 9 in. from both the inside and outside faces of the beam. Additional 14-in. bars were spaced at 6 in. c-to-c along the top and bottom of the beam making a total of 58 bars. Stirrups were 2-in. round bars, 18 in. c-to-c. High early strength cement was used in the mix, which was designed for a compressive strength of 4,000 psi. This reinforced beam was designed to resist unequal forces that tended to push the cofferdam out of round. No measurement of stresses was made but there was little indication of strain in the wales.

Work on and in the cofferdam demanded access for heavy equipment all around. This access was provided by a piles-supported circular trestle that also served as the upper templet for driving the sheetpiles. The area to be enclosed was excavated to El. +11 —about winter river stage. A lower inner templet was laid at this level, then sheetpiles were set in position for the full circle, and driven. The piling was set with such precision that the closing sheets slid into place without the job-made sheet frequently required.

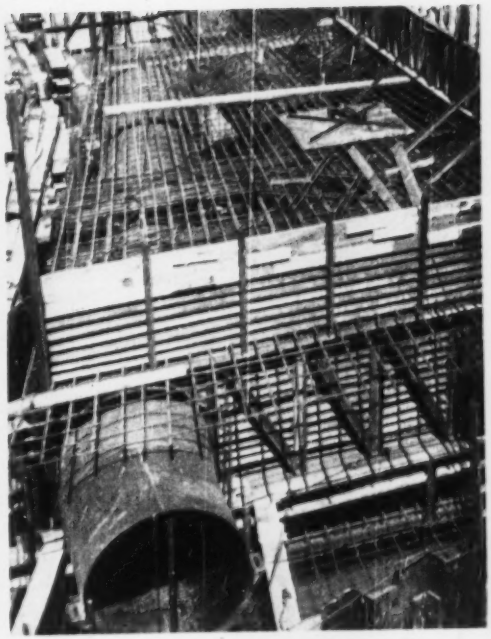
Excavation was carried to the top wale level, and the wale formed and poured before excavation was carried to the lower wale location. (The circular wales were supported vertically at ten points in the cofferdam by steel H piles driven to rock.) The concrete rings were formed by spreading steam cinders to grade on the sand inside the cofferdam and building inside and outside walls of lumber. The inside form was braced against staked sills in the sand and the outside form was set against the sheetpiles.

More water than was anticipated came into the cofferdam. To reduce the possibility of inflow "quickening" the sand to a condition where a blow might occur, the cofferdam was partly refilled by dumping in sand to about the elevation of the top wale.

• **Caissons driven**—Next operation in the cofferdam was to drive twenty 30-in. dia. caissons to rock and then drill



TREMIE POUR required a variety of concreting equipment, including transit-mix trucks (feeding direct to tremie hoppers or to concrete pump in foreground) and two pavers. Beams carry tremies, do not brace cofferdam.



INTAKE PIPES were assembled in steel frame above water. Reinforcing steel was added, then assembly sections were lowered to place in wet cofferdam for connection and incasement by tremie concrete.

6 ft 6 in. sockets into the rock for insertion of 14-in. 264-pound H sections to carry the load of the structure. (Maximum permanent load is 1150 tons per caisson downward, with 550 tons temporary uplift.)

During installation the caisson shell extended to the surface of the sand inside the cofferdam, but the H core was cut to a length that would just reach the top of the tremie seal; a short reinforcing cage was placed at the pile's top. After concrete was placed underwater in the caisson to a level 1 ft above the design bottom of the tremie seal, making the H section and shell of the drilled-in caisson into a unit, the caisson pipe was burned off at this elevation and the top portion removed. The H core and reinforcing cage extended into the tremie seal space for transfer of compression and uplift forces.

At this stage the cofferdam had 40 ft of sand in it above the elevation of the bottom of the tremie seal and was entirely open for 97 ft dia. This large open area, made possible by the circular wales, permitted sand removal by a hydraulic dredge pump operating from a barge floating in the cofferdam. As soon as excavation was complete a layer of crushed stone 1 ft thick was placed over the bottom, as a base for tremie concrete.

• **Seal placed sectionally**—To keep the size of pours within limits that could be completed in one operation, and to avoid the danger of equipment breakdown (interruption of a large tremie pour), the cofferdam area was divided into three sections by forms along two sides of a center third. Reinforcing for tremie seal was assembled into mats on flat ground adjacent to the cofferdam. These mats had holes to match the locations of the drilled-in caissons. The forms for the center third of the cofferdam were assembled complete, ready to receive concrete. Panels were fabricated with light-weight sheetpiling with corrugations horizontal, to form keyed surfaces. Ends of the panels were hinged to pass the ring wales, for subsequent alignment by divers. After installation, openings that occurred under the form or at the ends were filled with sacked concrete which were also placed by the divers.

In preparation for tremieing the concrete, five pairs of trussed beams, spanned the cofferdam; on these, concrete hoppers carrying tremie pipes were arranged to slide.

Part of the tremie seal concrete came from commercial plants, in transit mix trucks that delivered either directly to tremies or to a concrete pump. Dry batched material, also from commercial plants, came to two pavers that operated on the work platform. On the first third of the tremie mat, 800 cu yd of concrete was placed in 16 hours. For the last third only 7 hours were required.

Concrete placement was entirely satisfactory and the seal was tight when unwatered at a differential head of 36 ft. Laitance was cleared from the seal's surface and necessary keyways were cut to prepare the surface for a reinforced slab varying in thickness from 4 in. minimum to 2 ft 3 in. maximum. This slab was designed to act integrally with the tremie mat and form the bottom of the pumpwell.

Open work space again paid off in forming the intricate pumpwell structure above the mat. Forms were made in large reusable panels that could be moved freely around the circular structure. Concrete for the permanent structure was placed by pump and pipeline so that job cranes were available to set steel, move forms and the like.

• **Intake construction**—Second major feature of the construction was installation of the intake, extending 250 ft out into the Mississippi. The intake centerline is 26 ft below mean river surface and 40 ft above good foundation material.

The intake also was constructed inside sheetpile protection but this section was not designed to be pumped out. Wood-pile trestles were built on both upstream and downstream sides of the permanent structure, to accommodate crane operation around the work and help support the cofferdam. From the trestle, Z sheets were driven varying depths into the river silt, with the outshore end embedded in the underlying rock. Before driving, holes were cut in the piling at a level that would be below water, so there could be no differential head on the piling. Earth inside the cofferdam was excavated to El. —23, which allowed space for 18 in. of crushed stone to carry tremie concrete.

The permanent intake frame structure contains three 6-ft 6-in. pipes, 9 ft c to c with their centers at El. —13.75, and one 5-ft 6-in. dia "warming line" (above intake pipes on the upstream side) through which warm water is discharged at the intake in cold weather to keep ice from entering the cooling lines. Frame and pipes are incased in concrete. Five pairs of 24-in. dia drilled-in caissons with 53-lb H-section cores, and one pair of 30-in. caissons with heavier cores, extending 5 ft into rock, support the intake.

The intake was placed in six sections 40 to 50 ft long, with a short closure length adjacent to the pumpwell. For each section the three intake lines and the warming line were assembled in a structural steel frame suspended on brackets from the cofferdam sheets, vertically above final position.

Both ends of the first section and one end of each of the succeeding sections were bulkheaded to prevent longitudinal flow of concrete. Concrete reinforcing steel was erected on the structural frames, for setting as a unit.

• **Sections connected under water**—Connection of the successive pipe sections was effected by a butt strap—a 12-in. by ½-in. circular plate around the pipe at the joint. The bottom half was welded to the first section placed; the top half was welded to the next section, with a bracket at the joint, for 1-in. bolts that were placed by a diver. Sections were lowered successively, from the outshore end to the pumpwell.

Hand hoists picked up a section, brackets were cut loose, and the hoists lowered the section to position. Cables held it in position until tremie concreting (full depth over caissons and crushed-rock mat) was completed. Concrete was not placed for any unit until at least the next adjacent section was in position.

Final operation was removal of the circular cofferdam and part of the sheetpiling used for protection of the intake. The circular cofferdam was backfilled with sandy material dumped into water to consolidate it as much as possible. The concrete ring wales were cut to remove the sections where the intake connects to the pumpwell, and the sheetpiles of the circular cofferdam were pulled. The sheetpiles and the work trestle around the intake were removed to complete this portion of the work.

For Stone & Webster Engineering Corp. who designed and supervised construction of the plant extension, general supervision of design was the responsibility of E. A. Dockstader and W. S. Colby. G. H. Hill was in charge in the field, with Albert Smith serving as resident engineer. Stanley Stokes is chief engineer for Union Electric Power Company. Chas. T. Main, Inc., did the detailed design of the pumpwell and intake.

Western Foundation Corporation and its associates, Spencer, White, & Prentis, Inc., and Drilled-In Caisson Corporation were represented on the work by Harry Larson until his death early in 1949. John Heddy, field engineer from the start of the work took over as superintendent to complete the project.

Record Size Expansion Joints for Davis Dam Penstocks

NEAR RECORD SIZE expansion joints (46 ton, 22 ft ID) are being installed in penstocks of Davis Dam on the Colorado River, 65 miles below Hoover Dam.

Actually, the joints have little to do with expansion in the five penstocks. Their function is to allow differential movement between the intake and powerhouse structures. Movement of the penstocks proper is effectively limited by fins welded to them and embedded in the encasing concrete.

Movement of the intake structure relative to the powerhouse may occur due to variation in loading at different water surface elevations. The expansion joints provide for 4-in. vertical and 2-in. horizontal movement. USBR engineers computed these movements on the basis of an assumed modulus of elasticity of the foundation.

Original design had the intake and powerhouse structures close together and with parallel axes. One expansion joint was provided for each penstock. However, when unexpected foundation conditions were encountered, the powerhouse and intake structures were separated by a small angle (ENR June 12, 1947, vol. p. 948). As a result the penstocks differ in length. No. 1 is almost 300 ft and No. 5 is 167 ft. Three expansion joints are installed in penstock No. 1, one in penstock No. 5 and two in each of the other penstocks.

The joints consist of heavy inner and outer sleeves, with two stuffing boxes containing lubricated flax packing that is compressed by packing glands. To insure free movement and prevent corrosion, the inner sleeves are nickel coated on the outside.

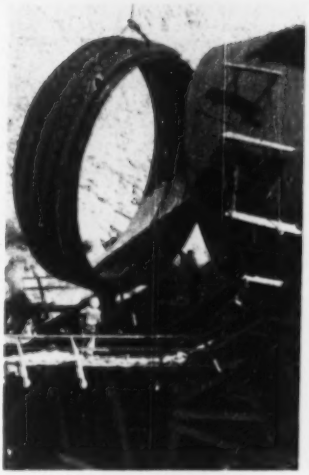
Six of the ten expansion joints are of the type shown in the accompanying illustrations, with a 26½-in. wide center piece holding the packing gland bolts. The four other expansion joints have only a 14-in. wide ring as a centerpiece. These latter joints permit slightly less movement and are considerably lighter in weight.

Each expansion joint is enclosed in a concrete chamber and so is not subject to the direct rays of the sun. USBR engineers plan on a periodic tightening of the packing gland bolts to insure a leak-proof fit.

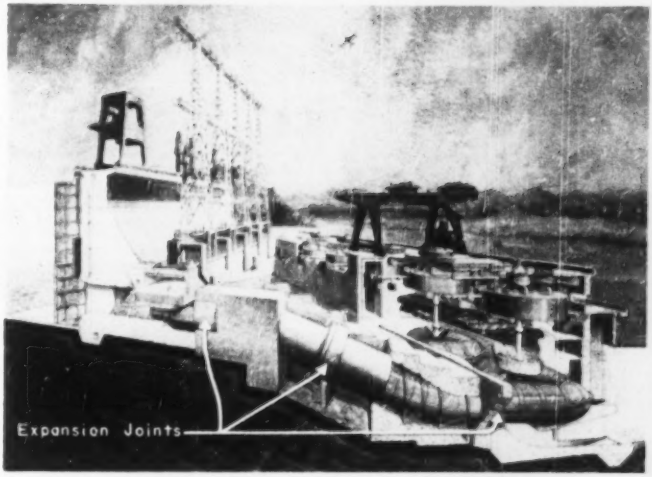
The ten expansion joints were fabricated at a yard near the dam. Moved to the dam by trucks, they were unloaded and set in place by unloading cranes. Actual positioning involved an intricate system of jacks and come-alongs. To add to the difficulty of the work, the center lines of some of the joints were as much as 20 deg. from horizontal.

Davis Dam is a project of the U. S. Bureau of Reclamation (ENR July 14, 1949, p. 52). J. N. McClellan, chief engineer. H. F. Balmicier is Davis Dam construction engineer.

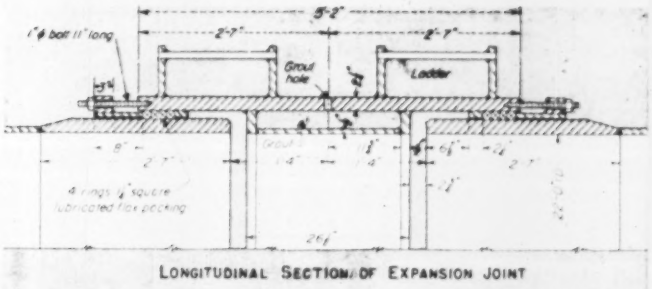
Penstocks were fabricated by Southwest Welding & Manufacturing Co. and installed by the J. H. Pomeroy Co., Inc. Southwest has a contract directly with the USBR. Pomeroy's contract is a subcontract under the joint venture headed by Utah Construction Co. that holds the prime construction contract. J. R. MacDonald is project manager for Pomeroy and H. E. Williams holds a similar position for Utah.



SIX EXPANSION JOINTS like this are welded into Davis Dam penstocks. Rods around perimeter serve as ladders for workmen tightening packing gland bolts.



EXPANSION JOINTS will allow differential settlement between the intake structure (left) and the powerhouse (right).



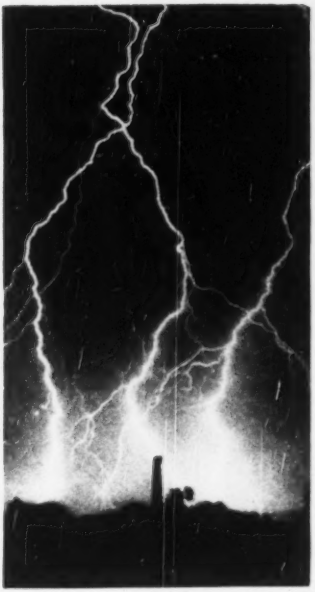
LONGITUDINAL SECTION OF EXPANSION JOINT

EIGHTY PACKING GLAND BOLTS will exert pressure on the lubricated flax packing of the stuffing box on each side of the expansion joint.

Some Principles Of Lightning Protection

Edward Beck

Manager, Lightning Arrester Engineering
Westinghouse Electric Corp., East Pittsburgh, Pa.



LIGHTNING STROKES average 9.5 from each square mile of sky area in regions of 30 storm-day incidence

You *can make your buildings* safe against lightning damage. The latest theories on lightning show how.

One theory, for example, explains how a lightning stroke forms, and is a guide to effective protective measures: (1) The charge accumulates in a cloud, equal and opposite charges forming simultaneously in the earth below. (2) A pilot streamer starts earthward when the charge builds up to sufficient intensity. (3) When it comes close to the earth, a short streamer rises to meet it. (4) The streamers meet, establishing contact between cloud and earth or some object connected with the earth.

• **What happens**—Establishment of this contact is like closing a switch between two opposite charges—one charge residing partly in the stroke channel and partly in the cloud, and the other charge in the earth. A high impulse current first flows to neutralize the charge in the stroke channel and may then turn into a moderate current of longer duration than the first peak to exhaust whatever charge remains in the cloud. As the potential in the charge center from which the stroke started falls, other adjacent charge centers in the same cloud may discharge into it and down the same channel, thereby producing successive current peaks.

In general, lightning stroke current rises to its maximum in from 1 to 10 microseconds (millionth of a second), declines to half value in from 10 to 100 microseconds and has a life of a few thousand microseconds. The crest of the current may be from 1 to more than 160,000 amp.

Consideration of the formation of lightning strokes makes it apparent why tall projections from the earth's surface are struck more often than adjacent areas and why there is around such a projection, a region seldom struck. If the path of the pilot streamer is close enough to the top of a tower, the electric field between the tower and the leader's tip becomes sufficiently intense to draw a streamer from the tower toward the leader. Contact is made and the stroke current passes through the tower. Therefore, there is a region surrounding the tower where strokes are highly improbable.

• **Probability of hits**—It is of some interest to speculate on the probabilities of a building being struck.

From data obtained in field research, it has been concluded that in regions of about 30 thunderstorm-days per year, there are about 9.5 strokes from each square mile of sky area. (In the region of the Carolinas, with some 40 storm days per year, the figure is about 15 strokes).

On the average, masts up to about 600 ft in height are likely to be struck once a year for every 275 ft of height. (In the Carolinas, the probability is once a year for every 30 40 x 275 or every 200 ft of height.) Above that height the probabilities increase faster, because the field at the tip of a very high structure becomes so intense as the charge in the cloud and the earth are built up that the pilot streamer starts upward from the structure instead of downward from the cloud.

After weighing the data for masts, the statistical data on strokes to transmission systems or overhead ground wires, and the probabilities of strokes to open country, the conclusion is reached that a building 100 ft square and 50 ft high will be struck on the average about once in 10 or 15 years. Within certain limits, the chances of being struck vary with its height but not in the same ratio as its area. For example, a tall building is considered as a mast. Thus, a building 200 by 100 ft and 600 ft high may be struck four times as often as once in 24 to 4 years.

It should be borne in mind that nearby structures or adjacent hills may reduce the exposure. On the other hand, a building on a hilltop or a hillside may be subject to more strokes than one on level terrain.

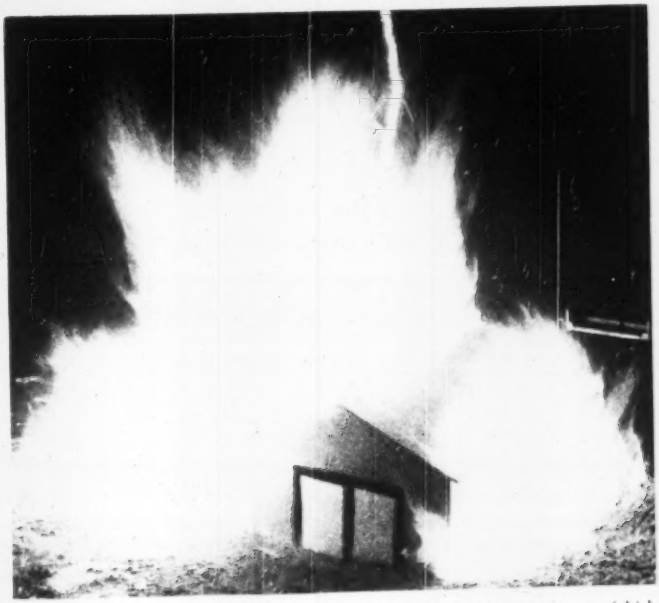
These figures are average and will be influenced by local conditions. Also, the building can be protected by well grounded masts or rods. For example, with a mast projecting 55 ft above the middle of the roof, the building itself would be struck once in 10,000 years, although the mast might be struck once every ten years. A greater number of shorter masts or rods can accomplish the same result; for example, four masts each 15 ft in from the corners and projecting 15 ft above.

Lightning discharges produce voltages in structures such as buildings, masts and trees, and from transmission lines or other circuits to ground in two general ways:

(1) If lightning strikes a structure, the stroke current produces voltage depending on the character of the current and the electrical impedance of the structure. In an object of high impedance, such as a tree or masonry, or in a transmission line, high voltages often develop. Damage, such as physical rupture, fire or flashover, sometimes results.

(2) In conductors of low impedance, the voltage between electrically adjacent points will be much lower and no damage will result.

Lightning can be prevented from striking buildings and other structures by shielding with rods, masts or overhead wires electrically grounded. Good



DAMAGE from lightning results from high voltages developed in structures of high electrical impedance, such as the masonry model above. It can be prevented by adequately designed protection systems.

shielding is achieved when of 1,000 strokes terminating at an object or its shield, 999 are dissipated by the shield and only one gets through to the object (0.1 percent exposure).

• **What to do**—The major problem in industrial plants is not so much the protection of the buildings themselves, but rather the protection of the many motors and control devices connected to the electrical circuits.

The first step in safeguarding this apparatus is to keep lightning voltages out of the supply circuit. These circuits vary in vulnerability depending upon how well shielded they are.

Circuits completely contained within well grounded metal buildings will generally not require protection from lightning.

Circuits completely contained within buildings that are adequately shielded by rods or masts will not require protection, if the circuits are of grounded, metal-sheathed cable or conduit. Open wiring in such buildings may require protection.

Open-wire circuits contained in wood or masonry buildings without any shielding should have lightning protection.

Circuits that pass outside buildings and then are not in grounded metal sheathed cable should be protected regardless of the type of building because lightning can strike the outside sections and thus enter the structure. Arresters and capacitors should be installed wherever the circuits leave the building. Also, the outdoor circuits should be protected by overhead ground wires or other shields. If the circuits in the building are radial (ENR Oct. 2, 1947, vol. p. 454), the remote ends of the circuits should also be equipped with arresters to prevent the building up of voltage by reflection at the end of the line.

Buildings largely of metal, with roof and walls electrically well connected and grounded, may be struck by lightning, but there is little risk of any physical damage or fire. The current is conducted to the ground through the metal without causing high voltage drops in the structure. (Buildings like the Empire State in New York and other skyscrapers are struck frequently without anyone in the building being conscious of it.)

It is important, however, that the metal parts be well connected together so that no high voltages or sparks develop that might cause damage.

The many types of lightning arresters available, many of them highly decorative, are readily available through national manufacturers.

• **Safety against hits**—In considering lightning protection systems, specifically, certain basic principles may be set forth. Some of these have been developed by such groups as the National Board of Fire Underwriters, others by individual manufacturers of lightning-arresting equipment.

Basically, the purpose of a system of lightning protection is to dissipate the charges with the least disturbance possible.

To accomplish this, it is necessary that the system be arranged to intercept direct hits, prevent the accumulation of charges on insulated metallic objects, and permit the discharge to pass safely to the ground. Improper materials used as conductors, haphazard coursing, carelessly made splices and joints, and ineffective or inadequate grounds will obstruct the safe passage, of course, and should be avoided.

Since metal provides the greatest conductivity, it is necessary that it be used as the conductor—copper and galvanized iron being recognized by the fire underwriters as "well suited" for the purpose.

The conductor must be in good contact with permanently moist earth to provide a ground connection having low electrical resistance. The number of ground connections will vary with the nature of the structure to be protected as well as with composition of the earth.

"Without the requisite number of effective grounds, no system can provide a maximum degree of protection," according to the fire underwriters. "Therefore, it becomes apparent that the drafting of detailed specifications is the work of experts in the field of lightning protection, and that these connections should be subject to field inspections by those skilled in the art."

Insulated metallic objects should be bonded to the protection system to prevent accumulation of electrical charges or should be grounded directly.

The interception of direct discharges may be effected by using metal points or air terminals, which are in turn electrically and mechanically connected to the grounds (through conductors). The number, height and location must be determined by the nature of the structure, but generally they should be located on high projections, such as chimneys, towers and gables.

"Here again," say the fire underwriters, "the drafting of details is the work of experts."

Other items that demand detailed specifications are the coursing of roof and down conductors, proper methods of joining and splicing, and proper fastening of connectors.

PONTOON SECTIONS were launched, then joined together, to form 78x30x7-ft hulls capable of swift and easy dismantling

Portable Dredges Split 3 Ways to Fit Through Schuylkill River Locks

Fred J. Schmidt

Chief Engineer, American Steel Dredge Co. Inc., Fort Wayne, Ind.

THE COMMONWEALTH OF PENNSYLVANIA owns four new, completely portable hydraulic dredges, now busy desilting the Schuylkill River from Reading to Norristown. Planned for the job of removing anthracite coal culm from the river bed to riverside basins (ENR Mar. 10, 1949, p. 21), the 15-in. electric dredges are designed for quick dismantling for passage through narrow navigation locks and under low bridges. Each cost $298,000.

The dredge hull—78 x 30 x 7 ft is made up of nine pontoons, bolted together near the deck level and secured with specially designed watertight pin connections near their bottoms. Divided lengthwise into three parts, the hull can get through the narrowest lock on the river and never has to be hauled out and around such obstacles. A minimum amount of machinery must be removed from the dredge in this operation. The main motor, pump and some auxiliary equipment remain aboard. It is estimated that it will take three to four weeks to completely dismantle and reassemble the dredge in a pool-to-pool move.

• **Connection details**—The underwater pin connection for pontoons consists of heavy 3-in. plate tongues welded on all outboard pontoons that fit into box connections in those inboard. The tongue is drilled with a tapered hole, and the connection box in the mating pontoon is fitted with a tapered pin. A packing gland arrangement in the box permits locking the pontoons below water without leakage. The pins, made of a special alloy steel, are designed so that packing may be renewed below water.

The same pin arrangement locks pontoons together longitudinally.

• **Overhead clearance**—The dredges must operate under and pass beneath bridges that have a minimum overhead clearance of 13 ft. Normal draft is 5 ft 2 in., and by flooding the six outboard pontoons of the hull, draft can be brought to 4 ft or more, if necessary, to let the deckhouse clear a low bridge.

A combination bilge and ballast system comprises a 2½-in. header on the center pontoons with 1½-in. pipes to the outboard, watertight hull compartments and a cesspool pump for dewatering these compartments through the same lines. There are two 250-gpm service pumps for supplying ballast water; these also supply sealing water for the dredge pump, priming, ladder bearing lubrication, fire and general service.

With draft brought to maximum, the dredge can work under low bridges by lowering the A-frame forward to the level of the deckhouse roof. To pass the entire dredge beneath a low bridge, the spuds on its stern must be unshipped and floated behind while the spud frame is lowered to deckhouse height. Auxiliary hoists on the main drum are fitted for this purpose.

• **Power from ashore**—Power comes from substations on shore through a 5,000-v submarine-type cable. A specially cable connection is located on the stern near the digging spud for

TIMBER SPUDS are unshipped and floated behind dredge and the spud frame is lowered to deckhouse height when dredge must pass under low bridge crossing river.

MATED PONTOONS shown on shore have male and female locking devices.

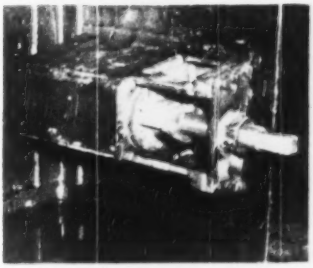
least motion during swinging operations of the dredge. From this connection, cable runs to a substation located on the stern of the dredge inside the deckhouse which contains the primary switchboard for the main motor, a 500-kva, 4,160-440-v transformer and a 440-v switchboard.

The 440-v switchboard controls power for auxiliary lighting panels and auxiliary motors running service pumps, hoist, ladder, cutter and air compressor.

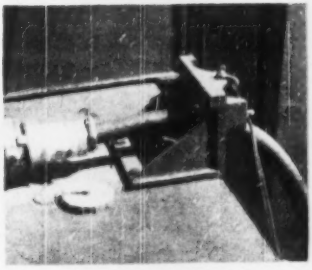
The main dredge pump is driven by a 1,250-hp, 4,160-v, 3-phase, 60-cycle, direct connected motor operating at either 490 or 363 rpm. The pump has a capacity of 9,000 gpm under a total dynamic head of 250 ft. It was expected to pump 400 cu yd of cubic an hour; actual performance was hit near 700 cu yd per hour. There is a cleanout in the 15-in. suction pipe in front of the pump. Priming is done with a water ejector using water supplied by the service pumps.

The main hoist is a five drum assembly with a 25,000-lb line pull at 40-fpm speed. It is powered by a 50-hp, 900-rpm motor. Because of low bridge clearances, the hoist was kept low, and cables leading from its underside run underneath the control room floor. Thus, the dredge deck is kept free of cable obstructions.

In addition to the main hoist, there are two auxiliary drums on the main hoist shaft, one at each end. These



PIN LOCKS LUG IN BOX—A tapered pin in watertight packing slides into the hole in lug on next pontoon, locking it.



POWER comes from ashore through marine-type cable to connection on the dredge. (American Steel Dredge Co. photos)

auxiliaries raise and lower the A-frame and spud frame when necessary.

• **Reaches 20 ft down**—The ladder can be operated with A-frame in either raised or lowered position, and the dredge's 57-in. dia. cutter reaches to a depth of 20 ft. The cutterhead is of the closed type, driven by a 75-hp motor at either 12½ or 25 rpm.

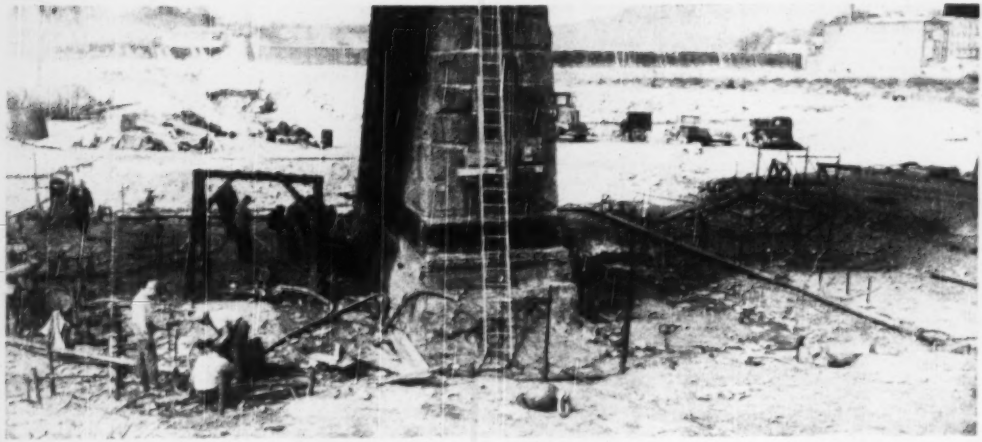
Spuds are 20 in. square and constructed of cross-bolted Douglas fir; corners are reinforced with heavy steel angles. Spud keepers have hinged gates to facilitate removal of the spuds at low bridges.

Heavy sheet-steel panel construction was used on the 65 x 20 x 10-ft deckhouse. Panels are bolted together (inside, for appearance), and joints are sealed with gaskets. All wiring and piping is arranged for easy disconnection—convenient terminal boxes for wiring and flanged joints or unions for piping. Each section is labeled to facilitate reassembly.

An air compressor driven optionally by a gasoline engine or electric motor supplies general service air throughout the dredge. An emergency gasoline-driven generator plant is used for lighting when shore power is disconnected.

The four identical dredges were designed by the Schuylkill River Project Engineers, a group of prominent consulting engineering firms in Philadelphia, Pa.

American Steel Dredge Co., Inc., of Fort Wayne, Ind., built and assembled the units.



TOUGH GROUND required special punch and casing for inserting wellpoints that helped dewater bell-bottom caisson excavation on both sides of Connecticut River bridge pier. Pumping from open sumps alongside caissons was also used. (Moretrench photo)

Old Bridge Piers Hang in Underpinning

TWO OLD BRIDGE PIERS at Holyoke, Mass. now rest in steel "cradles"—the principal elements of an exacting underpinning job. Each cradle is composed of curved bars (acting as hangers) that transfer the pier loads to new beams running along both sides of the pier. Beams are supported by belled-out caisson foundations.

In addition to careful procedures for placing the underpinning itself, construction includes the solution of a tough problem in placing wellpoints around each pier.

The stone piers are two of several that support a 4-lane county highway bridge across the Connecticut River a short distance below the Holyoke Water Power Co.'s historic stone dam. Pier underpinning is part of a project to develop 15,000 kw hydroelectric power in a new station at the dam. The project will be complete in 1951. An important feature of the project is the excavation of a deep tailrace from a point 3,000 ft down river, back to the dam. The tailrace, with a top width of 145 ft, passes through the 150-ft space between the two piers at a depth 20 ft below the river bed.

Underpinning was necessary because the piers rested on timber grillages barely below the river bed, and tailrace side slopes, 1 on 2, were to reach almost to the piers. Bottom of underpinning is 15 ft below riverbed.

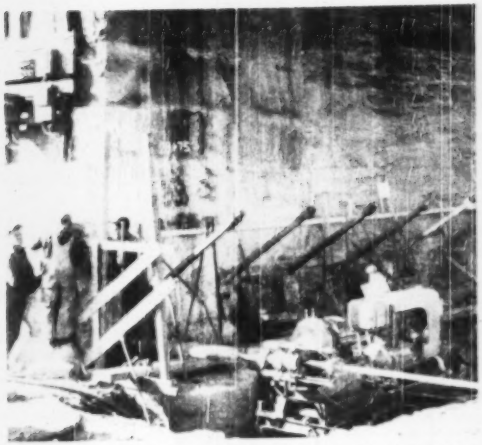
• **No disturbance permitted**—The drawings show essential features of the underpinning design, which was based on necessity of avoiding any disturbance to material underneath the piers. Caissons go down 10 ft at 5 ft 6 in. dia, then bell out in a 5-ft depth to 9 ft 6 in. dia. Four caissons support each of four header beams. Header beams are 58 and 60 ft long on the respective piers, projecting 4 ft 6 in. at one end, and 5 ft at the other, to frame into collar beams at the ends.

Twenty three-in. square rod hangers at 2 ft 1 in. spacing transfer each pier load to its pair of beams. Threads are upset, with an outside dia of 3¼ in. The rods, stressed to 120,000 lb, tend to clamp the beams onto the piers. Total dead and live load for each pier is 1,500 tons. The underlying soil is glacial material ranging in size from silt to 20-in. boulders, and containing cemented shingle-stone.

• **The construction job**—Work proceeded on both piers at the same time, and tailrace excavation between piers was not started until underpinning was complete.

One of the tough difficulties arose at the outset of work. Wellpoints were chosen to keep caisson excavations dry, but when installation started it was found that ordinary jetting or punching methods could not be used to make holes for wellpoint insertion. The riverbed material was too tough.

TAILRACE CHANNEL, to be dug between piers resting on timber grillages barely below riverbed, called for an exacting underpinning job.



HOLES FOR HANGERS were made by a combination of 6½ in. core drilling (shown) and percussion drilling. Mastic-covered hangers were inserted and grouted immediately.

TAILRACE EXCAVATION was performed after underpinning was complete. Underpinned pier shown in background. Hanger nuts will be covered after final stress check.

The solution was to drive a punch and casing together, withdraw the punch, insert the wellpoint and withdraw the casing. The punch was a 5½-in. -od steel bar, cone-pointed and hard-faced at the lower end and flattened and hard-faced at the top; a collar welded near the top of the punch bore on the 6-in. inside diameter casing. The length of the casing was such that the punch led the casing by 2 ft. Punch and casing were driven by a double-acting hammer riding on leads hanging from a crawler crane.

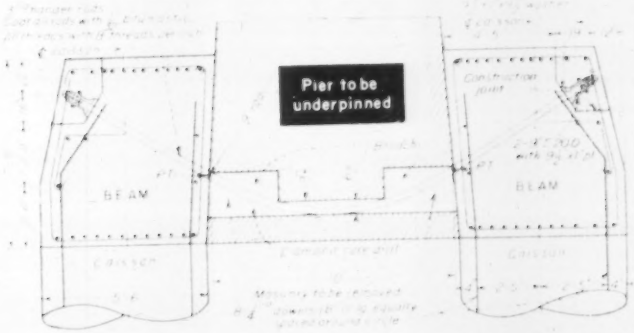
About 250 ft of 6-in. wellpoint headers were laid in excavation plan around each pier. About 100 wellpoints were set at various depths to intercept different water-bearing strata, and water was pumped by a 6-in. gasoline-driven pump.

Additional drainage was obtained by excavating 30-in.-dia sumps alongside caissons. Open pumping from these sumps was effective in drying up the caisson bells.

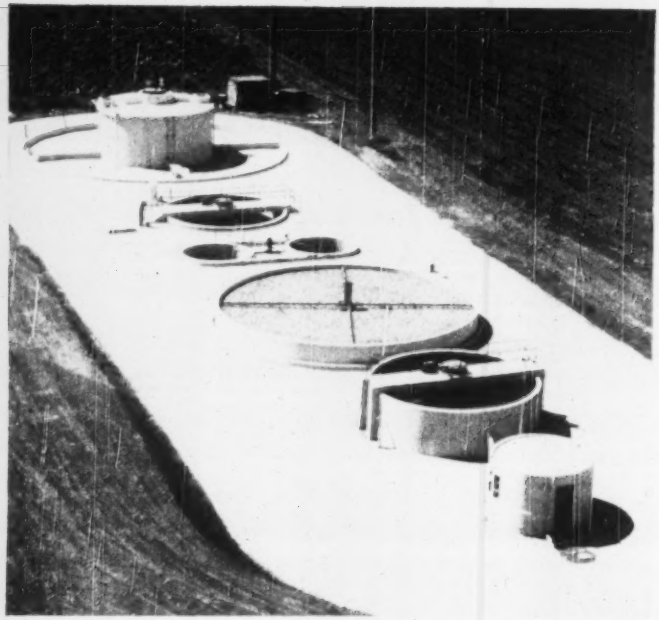
• **Caisson work.** Caissons were lowered by hand mining and mechanical mucking after timber grillages were cut where they projected into caisson areas. Transverse slots for the support bars were cut through the piers by diamond and percussion drilling. The original stone piers (built 1852) are 30 ft thick and are constructed of sandstone in their 40-ft length. An extension of the piers (1890) is of granite in an additional 12 ft. Via each slot a 6-in. diamond drill worked horizontally through the pier to form the bottom of the opening, after which percussion drills and benches shaped the slot near the pier faces to accommodate the upturned portions of the suspension bars. Satisfactory alignment of holes was achieved, with the result that bars were readily set to their required positions. As soon as holes were made, hangers were pressure-grouted into the openings. Open holes had to be farther than 8 ft apart; new holes could be opened three days after grouting was complete for an adjacent hanger.

• **Hanger units "keyed up."** When all hangers were in, beams were cast, leaving hanger threads uncovered, so that hangers could be stressed. After fourteen days, nuts were "keyed up" to 20,000-lb stress increments, progressively and in rotation, to the full 120,000 lb. A torque of 6,500 lb-ft on a well-lubricated nut yielded full stress. Keying up of bars was done on the basis of temperature measurements of hanger rods, as torques necessary to produce full stress varied with temperature. Hanger nuts were tightened by a hand-operated torque wrench working through a gear train with a 12 to 1 mechanical advantage. In the upper range, torques were applied by a wrench with a 6-ft handle, pulled by a cable attached to a power winch. A dynamometer in the cable indicated the force applied to the wrench. After tailrace excavation was complete, stresses were rechecked and hanger ends were encased in concrete.

Jackson and Moreland, Boston, Mass., the engineers for the hydroelectric project, prepared the engineering design of the tailrace and bridge underpinning work for the Holyoke Water Power Company. Robert E. Barrett Jr., President. Daniel O'Connell's Sons, Inc., Holyoke, Mass., is the contractor on the tailrace work, including the bridge pier underpinning. Robert A. Fischer is O'Connell's superintendent.



HANGERS—twenty-three 3-in. square rods—transfer pier load to beams, each of which is carried down 15 ft by four bell-bottom caissons.



UNCONVENTIONAL combination of processes achieves 95 percent BOD reduction in plant serving the 3,000 residents of Castroville, Cal.

Small Sewage Plant Has Unique Layout

A SEWAGE treatment plant with a circular appearance results from the in-line arrangement of circular units for Castroville, Calif., Sanitation District's recently constructed sewage plant. To sanitary engineers, however, more interest attaches to the combination of biofilter and activated sludge treatment processes to achieve 95 percent BOD reduction.

This small plant (0.5 mgd) serves a population of 3,000 in the Salinas Valley, 80 air miles south of San Francisco. Only economical available discharge point for sewage plant effluent is the Salinas River by way of a drainage channel that is dry many months of the year. It was necessary to provide an effluent of exceptionally high quality. That's why the two treatment processes were combined.

The plant units from foreground to background (in the accompanying photo) are control and pumphouse, primary clarifier, biofilter, two mechanical aeration tanks of the Spaw-mix type, final clarifier and sludge digester surrounded by drying beds. Site of the installation can be gaged by the diameter (50 ft) of the biofilter. Sewage flows through the plant by gravity after it receives an initial lift in the pumphouse.

Besides reducing the BOD by 95 percent, up to 95 percent of the suspended solids are removed in the processing.

As far as architectural treatment is concerned, all units naturally lend themselves to circular shape. Even the sludge drying beds have been constructed concentric with the digester in pie-shaped quarters.

Construction cost of the plant was $112,000. Converting this to cost per mgd for 100 percent treatment as of equivalent 1926 costs (as proposed by C. J. Velz in ENR Oct. 14, 1948, p. 544), the equivalent cost of $171,000 per mgd results. This compares very favorably in cost, it being much cheaper than the average reported by Velz.

The Castroville plant was designed by Harry N. Jenks, consulting sanitary engineer, Palo Alto, Calif., under the direction of Howard F. Cozzens, Monterey County engineer, Salinas, Calif., who represented the Castroville Sanitation District by supervising the work. Chester Dudley, senior structural engineer, assisted Mr. Cozzens.

The plant was built by Charles Mc-Closky Co., engineers and contractors, San Francisco, Calif.

How to Build Pavements Stronger, More Durable

Changes in materials, equipment and construction materials to improve the strength and durability of pavement concrete are recommended by F. H. Jackson, principal engineer of tests, Bureau of Public Roads, in an article published in the JOURNAL of the American Concrete Institute, March, 1950:

1. Substitution of effective vibratory methods for consolidating the concrete for conventional surface screeding, which he claims provides no compaction whatever.

2. Use of a low-slump (0 to ½-in.) concrete, designed to be placed by vibration.

3. Reduction of the maximum size of coarse aggregate to 1 in. and careful blending of aggregates to obtain uniform concrete day after day. For this purpose, aggregate should be separated into several sizes, such as, 1 in. to ½ in.; ½ in. to No. 4; No. 4 to No. 16; No. 16 to No. 50; and No. 50 to 0.

4. Redesign of equipment for mixing, transporting, spreading and consolidating pavement to handle the drier mix.

"Our present methods of building concrete roads are wrong," says Mr. Jackson. "... A concrete pavement in New York State costs about $4 per sq yd in place, exclusive of reinforcing, or about $100,000 per mile for an average 4-lane highway. The taxpayers have every reason to expect years of useful life from such a pavement. To have serious surface scaling and other defects develop before it is 2 or 3 years old is bad. To permit such a situation to develop simply because we are afraid to change our time-honored ways of doing things is not playing fair with those who pay for and use the roads. Why not do something about it?"

Ohio Sees No Shortage Of Underground Water

Although Ohio industries use an average of 385 mgd of underground water, the state is far from running dry on its underground supply, according to a report by the Water Division of the Ohio Department of Natural Resources.

Ralph J. Bernhagen, state water geologist, said that there are vast areas in the state where additional groundwater is available for development. "Only locally, in certain industrial areas, have groundwater levels been lowered excessively, primarily because of excessive pumpage," Mr. Bernhagen said.

TREACHEROUS PEAT BOG underlying a heavily traveled Ohio highway wrought havoc during attempts to raise the roadway grade—groundwater rose to a 10-ft depth and the upheaved peat folded back over the new embankment.

Grading Job Overruns 1,500 Percent

C. R. Hanes
Field Engineer
Bureau of Construction
Ohio State Highway Department

ALTHOUGH PEAT has many beneficial uses ranging from garden mulch to fuel, it is a poor supporting medium for roadway embankments. The Ohio Highway Department discovered this when it decided to raise a short stretch of roadway grade over a known peat bog, one mile east of Wellington, on State Route 18.

What started out to be a minor grade raise involving 8,587 cu yd of borrow, pyramided into a major grading job of 135,000 cu yd, an overrun of 1,500%. The project was only 1,500 ft long and the maximum depth of new fill including pavement was less than 4 ft. Moreover, instead of 30 days estimated for completion of the job, it took 15 months.

• **Boggy site**—The existing section of road was known to be underlain with a treacherous peat bog. In fact, the earliest road at this point suited the peat deposit, which has both a high organic content and usually a high moisture content. Later, the alignment was straightened and a thin earth embankment placed over the peat, topped with a traffic bound surface.

Some settlement occurred, but in the 1920's the roadway was brought up to grade and paved with concrete. Settlement continued, however, with the passage of time and under moderate single heavier loads.

• **Frequent detours**—During high water low points in the road profile were flooded, requiring that traffic be detoured several times a year. This route was carrying a high percentage of truck traffic.

When the Ohio Highway Department took over the job of improving the 1,500 ft of highway by raising its grade, the existing embankment and concrete pavement appeared to be in a state of equilibrium. Consequently, it was decided to place a light fill over the old pavement, topped with a new waterbound macadam pavement, surfaced with asphalt concrete.

A contract was awarded to the Ohio Engineering Co., Lorain, Ohio, in December 1947. Work was started the following April, with the extension of an existing concrete culvert flanked by two new corrugated metal arches, 52 in. span and 50 in. rise.

Borrow material was not limited to any special specifications, so the contractor selected a clay material located immediately adjacent to the job. Placement of the borrow material commenced in 8-in. layers was begun early in May 1948. On May 24, when the embankment was essentially completed, settlement occurred at two distinct points, about 300 ft apart.

• **Filling was futile**—A futile effort was made to restore the grade at these two points by continued filling. But the fill continued to settle. At the same time, the natural ground beyond the limits of the embankment began to rise, and cracks started to open up. Groundwater also rose to within 18 in. of the surface.

When it became apparent that the original stability of the road had been disturbed, it was decided that the most economical procedure would be to continue with the placing of the fill.

The plan was to place enough embankment material either to displace the underlying peat, or to compress it sufficiently so it would cause no further trouble.

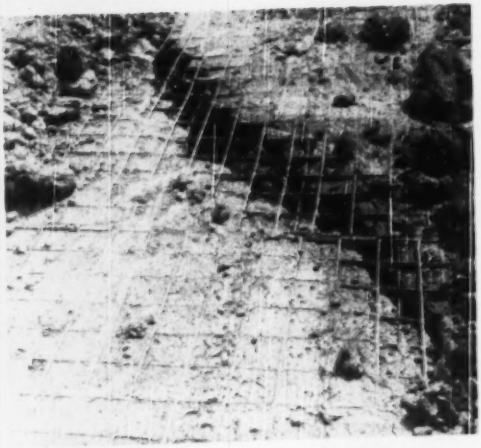
Placing of the fill continued on a day-to-day basis, with settlement during the night offsetting the depth of fill placed during the previous day.

• **Waterhole developed**—After two weeks of this, the continued settlement caused water to collect to a 10-ft depth at one point in the center of the fill area. This prevented continuing to place and compact the fill in regular layers.

Borrow material then was dumped along one side of the water-filled hole and bulldozed into place, gradually filling it. But about this time the edge of the peat bog beyond the limit of the embankment raised in a spectacular upheaval.

Great cracks also opened up, revealing

FIRST INDICATIONS of trouble ahead were huge cracks caused by subsidence of the added fill and corresponding upheaval of the underlying peat.



AS A FINAL EXPEDIENT diagonal cracks in the new embankment were bridged with war surplus airfield landing mats to carry the roadway surfacing.

ing large pieces of partly decayed logs. Moreover, the upheaved peat immediately beyond the fill limits started to fold back over the edge of the new embankment. This material was removed by dragline and trucks.

During this truly third period the affected area moved outward to the concrete and metal arch culverts, distorting them until subsequently they had to be replaced with corrugated metal pipes.

After a month of filling and settlement the 200-ft long water-filled area was filled above water level. Then the embankment was continued by placing it in layers and compacting it.

• **Three bad spots.** At about this time another 1800-ft length of fill began to subside at an accelerated rate. It was restored to embankment grade in similar manner, only to discover that a third trouble spot, about 400 ft long, was beginning to subside. This third area was filled and compacted by December 1949.

Only during the time needed to maintain depth of fill at new low point and complete the compaction of the fill. The original movement of 12 ft. (the excess of fill above finished grade) was reduced to 2 ft. from the weight of the superimposed loading.

Wanting to utilize to the full the work to be done during the two years, December 1948 to December 1950, the contractor was permitted to place fill during whole time. Until settlement was completed, as weather permitted until February 1949, when settlement was at a greatly reduced rate. Diagonal cracks, however, began to appear in the 200-ft section. These cracks apparently were caused by a tendency for the mass of fill to ju on a sliding plane to the left.

In an effort to close these cracks to permit placement of the paving, additional fill was placed and compacted. This operation was repeated several times with the cracking and settlement being on a reduced basis. However, the cracks continued to reappear to such an extent that it was undesirable to pave over the critical section.

Last April (1949) the highway department's maintenance forces determined to try a different method of bridging the cracks in the embankment.

• **Landing mats used.** Making use of both experience and materials used in the recent war, the highway department had 7x12-ft steel landing mats for airfields laid over the worst critical section of road containing the cracks in the embankment.

The mats were [illegible] from [illegible] Corps of Engineers. The mats were [illegible] to place [illegible] material on [illegible] and [illegible] over the [illegible] of the new embankment and [illegible] special to make [illegible] settlement. The [illegible] placed to permit [illegible] a minor period [illegible] pavement.

This was done [illegible] and the road was [illegible] to traffic on July 1. Subsequently [illegible] the mats [illegible] the [illegible] have been made to place [illegible] of the [illegible] Some minor [illegible] occurred and some [illegible] have appeared where the [illegible] mats were placed apart. Many [illegible] have been filled with [illegible] and since they have been [illegible] on a decreasing basis [illegible] hoped that the asphalt pavement can be placed this summer.

Looking back over the 15-month battle to stabilize this 1,500-ft at road, two modifications in the procedure might have proved effective in speeding the job. Carrying the fill section out to a greater width probably would have lessened the tendency of the underlying peat to rise and fold back over the edges of the fill.

Specifying a granular borrow material would have resulted in its being placed in the water more satisfactorily. Also the granular material would have had less tendency to transmit cracks because of the clay material.

• **Engineers in charge.** The project was carried out under the general supervision of the authority acting for the chief engineer of construction. It was started under the administration of Earl E. Rech, at that time director of the Ohio Department of Highways. Homer D. Anderson, chief engineer of construction, and Homer Bracker, division engineer. It has been carried to the present state of completion under the administration of T. H. Kinney, director since January 1949; T. H. Watson, chief engineer of construction, and E. A. Lorenz, division engineer.

Lyle Atkinson, division construction engineer, and H. H. Nugent, project engineer, were in direct charge of the project.

The present maintenance operations are being carried on under the direction of C. W. McCaughey, chief engineer, and J. W. Reppel, assistant chief engineer of maintenance, Ohio Highway Department.

HOW TO STOP! THESE HEADACHES IN H_2O

Without a working meter on every service you can't begin to know where a dwindling water supply is going. You can't stop waste. You can't control costs. You can't equitably apportion water charges. You can't even treat sewage economically. In short, without meters you have no control over a service vital to public health and well-being.

If you are struggling against the odds of an un-metered or only partially metered system, now is the time to do something about it. The nationwide water shortage has made both your consumers and municipal officials thoroughly water conscious. We've prepared a complete program that will help you present the true facts on the advantages resulting from 100 per cent metering in your community. Write today, no obligation involved.

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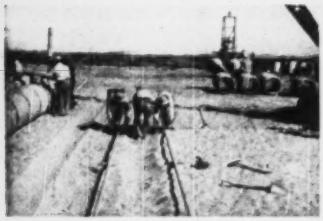
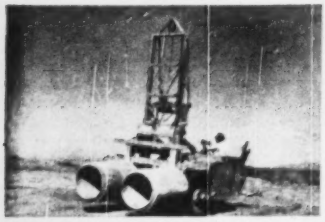
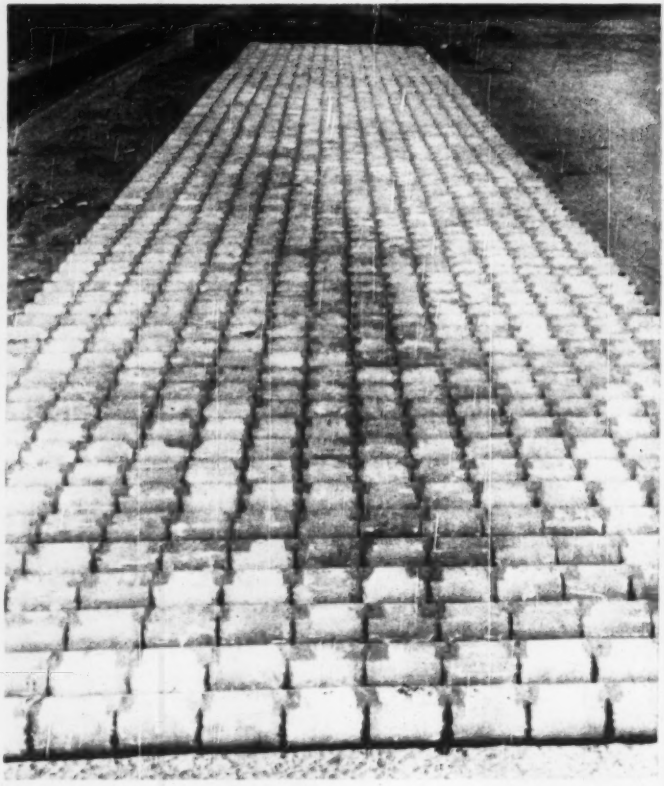


CAREFULLY ALIGNED, smoothed trench, was first prepared for . . .



PLACING 30-in. concrete-pipe culverts, by special double-prong rig

JOINTS were mortered and covered with sand to aid in curing



NOT A SUPPLY YARD, but the bed of a new road; 183 pipe culverts, laid on 5-ft. centers will provide drainage in the event of flash floods in New Mexico valley.

Pipe-Culvert Base Keeps Road Dry

As many as 183 parallel concrete-pipe culverts were used by New Mexico highway engineers to combat an unusual drainage condition. The culverts are 30 in. dia., are spaced on 5-ft centers, and are each 65 ft long.

Their pipe installation is to keep U. S. Highway 70-80 east of Deming, N. Mex., dry during occasional minor floods. Multiple culverts are cheaper than high fills because of the expense involved in hauling fill material. Deep channelization is impracticable because abutting farmland might be damaged.

This stretch of highway is in a long, flat, semi-arid valley (Mimbres) less than 50 miles north of the Mexican border. High mountains on all sides drain into the valley, and in times of heavy rains runoff is high. The sandy soil involved does not absorb water readily and, as a result, low spots are often covered with water for days after a rain. Thus, the multiple pipe culverts may be partially submerged until the water evaporates or becomes absorbed.

Biggest installation involves 183 lines of concrete pipe, each 65 ft long (16 pipe sections, each 4 ft long are used—the extra foot of length connections from the space allowed for mortar pointing). This complete installation will stretch 912 ft along the road and use 11,712 lin ft of pipe. Other installations involve 69, 43, 26 and lesser numbers of culverts.

Laid in sand The culverts are laid in a 12-in. layer of sand. To meet the requirement that 10% of the pipe surface be in contact with the bedding sand and at least 6 in. of sand be underneath the pipe, the contractor uses a part-circle screed. This operates on parallel pipe runners set accurately to grade.

Pipe used is ASTM standard C-76 culvert-pipe. Joints were sealed with cement mortar as soon as placed.

The culverts are backfilled with thoroughly compacted material meeting these requirements: 100% passing 3-in. screen, 55% passing No. 4 sieve, and not more than 30% passing a No. 200 sieve. Backfill is pneumatically hand tamped in 6-in. layers. No more than a 6-in. differential is allowed between backfill on either side of a pipe.

The backfill is carried 18 in. above the pipe and compacted there by rubber-tired compactors and sheepsfoot rollers. On top of this is a 6-in. asphalt processed base, plus a 1½-in. of asphaltic concrete.

This job is a project of the New Mexico State Highway Department, B. G. Dwyre, state highway engineer. Contractor is the W. T. Bookout Construction Co., Las Vegas, N. Mex.

READER COMMENT

Revised Beam Formula Helpful

Sir: A slight modification of the formula for design of laterally unsupported beams proposed by Samuel Reubene (ENR April 6, p. 46) would be much handier for designers. They could use the AISC handbook beam tables, which give total allowable uniform load in kips for beams laterally supported, if they would multiply the tabulated load by the ratio of L_u to the actual span.

Example: Find the total uniform load in kips that an 8-in. 17-lb wide-flange beam can carry when the span is 15 ft, laterally unsupported. Since the span exceeds the 10-ft L_u value given by the tables, the tabular load—12.5 kips—has to be reduced. For the laterally unsupported beam, therefore, the allowable total safe load is $12.5 \times 10/15 = 8.4$ kips.

RAYMOND J. HEREDIA
Structural Engineer
Blaw-Knox Construction Co.
Pittsburgh, Pa.

For Structural Engineers

Sir: I should like to call the attention of our American engineers in the structural and construction fields to an organization which in the twenty years of its existence has quietly and efficiently acquired for itself a worldwide prestige as a central international clearing house of technical information, and as a medium for discussion and publication concerning new developments, research and methods in these fields. I refer to the International Association for Bridge and Structural Engineering.

I have before me the current publication volume and the latest congress report of this association, and I am prompted to say that it would be difficult to find anywhere else in one binding so much material of value to structural and construction engineers—and at such low cost.

Developments and research in prestressed concrete, welding, suspension bridges, concrete technology, plate and shell construction, buckling problems, new concepts of inelastic behavior, vibrations, construction methods—these are but a few of the subjects covered, and in most cases the list of authors resembles an international Who's Who in our field.

The aim of the association is to promote collaboration between engineers of different countries for the exchange of ideas, of theoretical and practical knowledge, and of the results of research in the structural and construction fields. A special committee prepares the most important questions and problems of the moment for further scientific treatment and technical research, and suggests how the work may be most effectively carried out, the individual work in the different countries being coordinated to the utmost possible extent. Members are informed by reports and printed publications of the results of practical experiments and research. In addition, congresses are organized at four-year intervals, in order to advance and expand the task of the committee by personal contact with the members.

The idea of creating an international organization of this character originated from two international congresses, the first held in Zurich in 1926 followed by a second held in Vienna in 1928—each organized independently by interested parties, and participated in by over 500 specialists from many different countries.

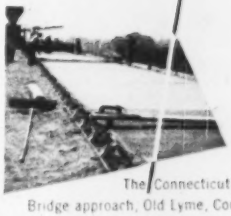
The International Association for Bridge and Structural Engineering, permanently organized in October 1929, has since held similar congresses in Paris in 1932, in Berlin in 1936, and in Liege, Belgium, in 1948. Although no official announcement has yet been made as to the 1952 Congress, present indications are that it may be held in England.

An increasingly large group of American engineers have for some time recognized the value of, and have held membership in this association. Although the association is managed by a Permanent Committee on which each country has representation in proportion to its membership, the organization functions on a national basis, and the U. S. group operates under articles of association adopted in 1939. A U. S. Council elected by the membership formulates policies and administers affairs of the association here.

The very nominal membership dues of $3.50 per year cover all of the operating expenses of both the national and parent organizations, and members have the privilege of purchasing the publications at reduced rates corresponding essentially to the cost of printing. It is gratifying to note that the U. S. membership represents one of the largest national contingents in the International Association, and is steadily expanding. All members of the association have joined me in the feeling that all American structural and construction engineers should affiliate themselves with this associa-

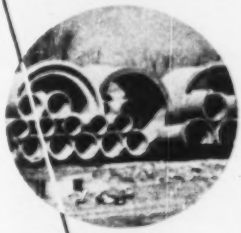
(Continued on page 49)

PAVEMENT...



The Connecticut River Bridge approach, Old Lyme, Conn., is paved with Darex AEA concrete to increase resistance to freezing, thawing, and de-icing salt action.

At Hume Pipe of N. E., Inc., Darex AEA is used in concrete pipe manufacture to increase production, improve quality.



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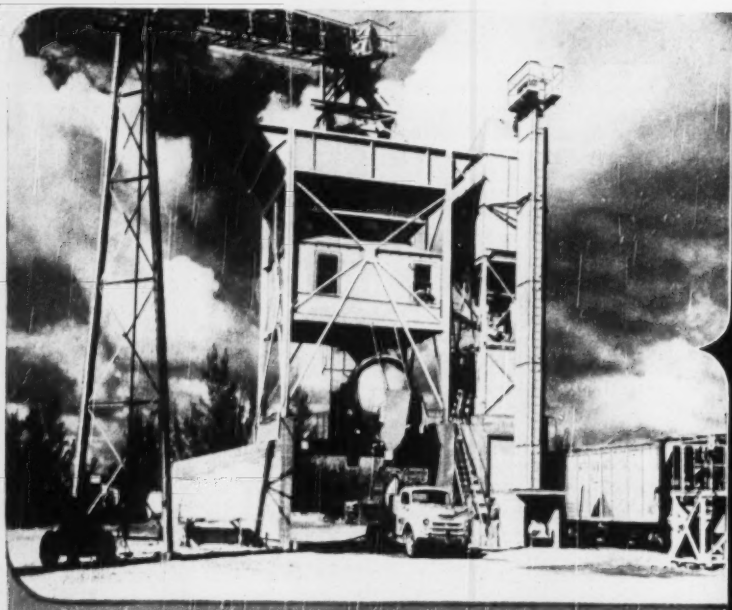

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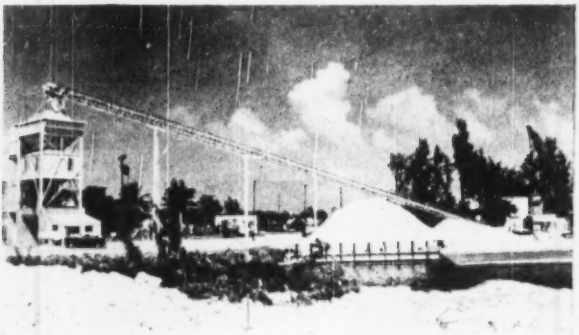

Barges of sand and reduced oolitic limestone are unloaded by clamshell into hopper and belt conveyed to 3-Compartment Erie Bin.

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(Continued from page 47)

tion which has so much to offer in the way of advancement of international understanding through the medium of our own professional interests. We invite all interested engineers to join this important organization.

DAVID B. STEINMAN
Chairman, U. S. Council,
International Association for Bridge
and Structural Engineering
New York, N. Y.

Water Pollution Control

SIR: Excerpt from editorial in ENGINEERING NEWS-RECORD of March 23, 1950, page 125, is quoted as follows: "The position of the U.S. Public Health Service in water pollution control remains to be clarified. Concern is being expressed in responsible quarters about its relation to state agencies, its duties and authorities. Some officials fear growth of a tremendous federal staff, question the value of ten river-basin organizations to deal with local problems already well understood by state authorities and suggest that state's rights may eventually be undermined."

In view of my designation by the President as the State representative on the Water Pollution Control Advisory Board, I beg to advise that I keep constantly in mind the dual form of government to which we all subscribe and the importance of limiting the power of the federal government to those activities specifically stated in the Constitution and such appurtenant powers as are essential to implement the powers specifically granted. In my activity on the board I have observed that to date the Public Health Service has been particularly alert to secure state's rights and has been agreeable to relinquish jurisdiction and be bound by compacts covering interstate waters.

The establishment of the basin engineers offices at the present time is essential to enable the federal government to prepare a well-integrated and workable plan of pollution abatement, which will be properly correlated with other activities of the federal government covering conservation, water-power development, flood control and wildlife. This undertaking is a proper one for the Public Health Service, but beyond capacity in 1947, and can best be accomplished by basin engineers. So long as this need exists I consider it proper to support the basin engineer organizations and it is my intention to recommend against their elimination if it appears at a later date that there is a duplication of effort.

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Boston, Mass.

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Edited by B. KENNETH JOHNSTONE, Carnegie Institute of Technology, and CHARLES E. JOERN, Wm. Joern & Sons, Realtor and Builder. Contributed to by a group of 12 authorities in the field.

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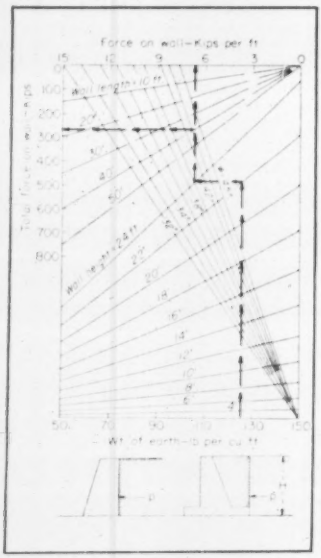


FIG. 1. FORCES against walls are given in the chart for level fills.

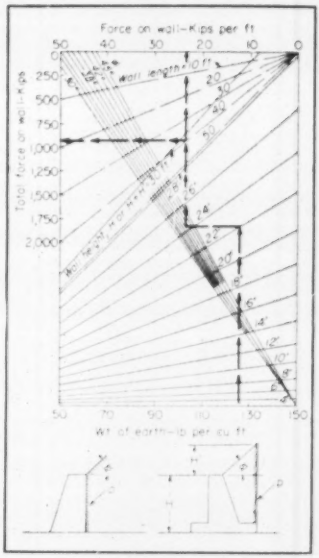


FIG. 2. SLOPING FILLS produce forces given by this chart.

Charts Give Loads Against Retaining Walls

The three charts presented here speed retaining wall design and checking. Based on Rankine's equations for each wall type, they eliminate cumbersome juggling of square and trigonometric functions on the slide rule in the computation of horizontal loads.

• Example 1—A 22-ft. high vertical retaining wall is to be designed for moist sand fill, the top of which is level with the top of the wall. Determine the force on the wall per linear foot of length and the total force on a 40-ft. long wall.

Inspection shows that Fig. 1 is suitable for this case. The chart is entered at the bottom with an assumed average density of 126 lb per cu ft for moist sand. This value is projected vertically to the 22-ft wall-height curve, across horizontally to 40 deg—the angle of repose of moist sand—and then vertically to the 40-ft wall-length curve. At the top of the chart 5,500 lb per ft is read, and at the left, the total force is found = 272,000 lb.

• Example 2—For the same conditions as in Example 1, determine the earth force per foot of length and the total force on the wall for a fill with a sloping face.

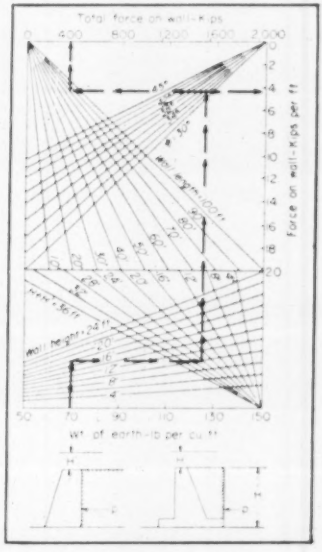
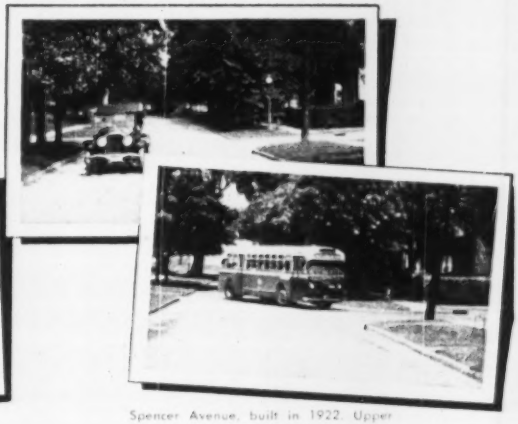


FIG. 3. SURCHARGE PRESSURES are accounted for in this chart.

Fig. 2 is used in the same manner as Fig. 1 in Example 1. The force per ft is found to be 23,500 lb and for the

(Continued on page 52)

West 43rd Street, built in 1924. Upper photo taken in 1927, lower photo in 1949



Spencer Avenue, built in 1922. Upper photo taken in 1923, lower photo in 1949

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Concrete pavement is economical too. For all but lighter traffic it usually costs less to build than other pavements of equal load-carrying capacity. It costs far less to maintain and it lasts much longer. All that adds up to ***low annual cost***, the true measure of pavement economy. And concrete's high light reflectance cuts street lighting costs as much as 50%.

For more information about durable, ***low-annual-cost*** concrete pavement write for a free copy of *"Concrete Pavement Design."* Distributed only in the U. S. and Canada.

Arlington Avenue, built in 1929. Upper photo taken in 1929, lower photo in 1949

Winthrop Avenue, built in 1929. Upper photo taken in 1929, lower photo in 1949

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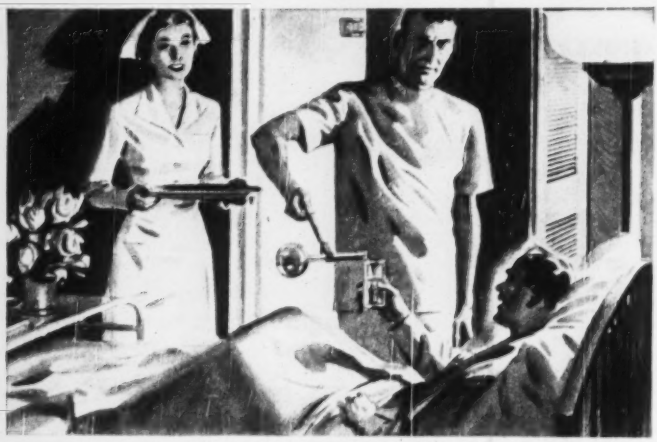

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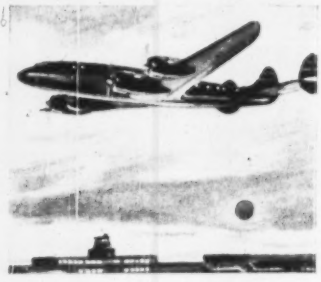

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Continued from page 50

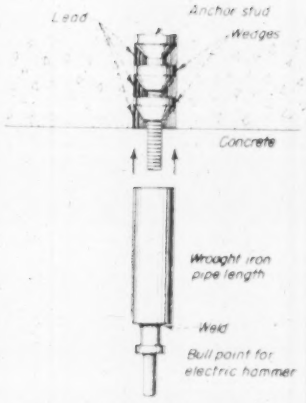
entire wall, 940,000 lb. If a leaning wall had been used, the solution would be obtained by projecting to the proper value of $H = H'$, instead of H.

Note that in both Fig. 1 and 2, the total force on the wall for lengths exceeding plotted values can be obtained by solving for some smaller length and multiplying the result by a suitable factor. Thus, for a 100-ft wall, solve for a 10-ft wall and multiply the result by 10. Of course, force per foot remains constant, regardless of wall length.

When the earth does not extend above the retaining wall top but supports an external load such as railroad tracks or a building, it is common practice to convert the load to an equivalent height of earth before solving. This is done by dividing the pressure of the upper load, in psf, by the earth density, in lb per cu ft. The result is H', or equivalent surcharge. Fig. 3 is suitable for such problems.

• Example 3. What earth forces act on an 18-ft high, 80-ft long vertical retaining wall when 70-lb-per-cu-ft soil with a 33.5-deg repose is used for fill and equivalent surcharge is 6 ft?

Fig. 3 is entered at 70 lb per cu ft. This value is projected vertically to the wall height, horizontally to $H = H'$ = 24 ft, and then vertically to 33.5 deg. At the right, 4,400 lb per ft is read. Projecting horizontally to the scale wall-length curve and then vertically again gives 352,000 lb as the total force.



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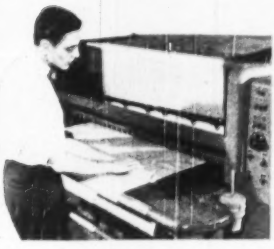

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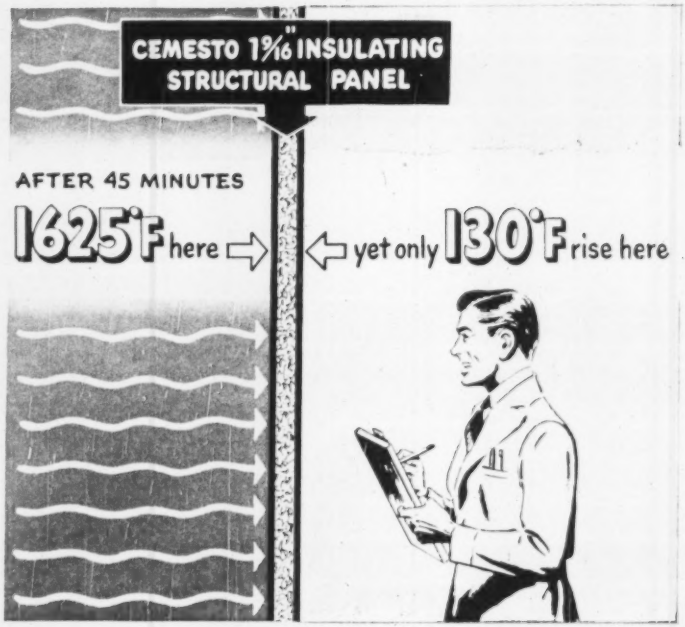
CEMESTO* PROVES AMAZING INSULATION VALUE IN STARTLING "TRIAL BY HEAT"

Dramatic tests demonstrate the remarkable insulating efficiency of the World's Most Versatile Building Material!



In recent tests made by an independent research laboratory, panels of Cemesto were put through a rigorous "trial by heat." Each panel was first set up as an enclosing wall of a special testing oven. One side of the Cemesto Panel faced the inside of the oven, and the other side faced out (see drawing). The enclosed side was then subjected to intense heat for a period of 45 minutes.

At the end of this time, when the temperature on the side exposed to heat had reached a torrid 1625 F., *the other side registered a heat rise of only 130 F.!* Dramatic proof, indeed, of the unusual insulation value of Cemesto Insulating Structural Panels!

Cemesto Panels offer many unique advantages

What do these tests mean to you? They mean that when you build with Cemesto Panels, you do more than save time and money on the construction of permanent roof decks, curtain walls and partitions. You *also insulate effectively without materially increasing the cost!* The result: buildings that are cooler and more economical to air condition in summer, warmer and thriftier to heat in winter . . . more pleasant, more healthful working conditions for occupants . . . greater production and fewer accidents through improved employee efficiency . . . increased client satisfaction!

The secrets of Cemesto's versatility

Strong, rigid, pre-formed Cemesto Panels are made of Celotex cane fibre insulation board to which cement-asbestos facing is bonded on both sides by a moistureproof bituminous adhesive. They are lighter than most building materials, yet have remarkable structural strength. Can be worked with ordinary hand or power tools on the job, or pre-cut to specifications at the mill for faster application. Quickly and easily applied to either wood or metal framing.

Cemesto Panels resist fire, weather and wear . . . *they are a "life-of-the-building" material!* Their smooth, hard, noncombustible, stone-grey surface has good light reflection value, and provides both exterior and interior finish. Unless required for decorative purposes, Cemesto Panels never need painting or maintenance. And their cane fibre core is protected against fungus, dry rot and termites by the exclusive patented Ferox* Process.

Cemesto gives your ingenuity free rein

Adaptable for buildings of all types from modest homes to giant industrial plants, Cemesto Panels offer many interesting possibilities for important economies in design, construction and maintenance. Their stability and permanence have been proved by almost 20 years of varied use in all climates, all over the world. Discover how this modern marvel of building materials can help *you* build better, faster and at lower cost. Write today for new technical data booklet, which includes latest design and application recommendations. The Celotex Corporation, Chicago 3, Illinois.

CEMESTO

INSULATING STRUCTURAL PANELS

THE CELOTEX CORPORATION • CHICAGO 3, ILLINOIS

DEVELOPMENTS ABROAD

Marshall Plan funds build port for French West Africa colony

Improvement of the port of Abidjan, on French West Africa's Ivory Coast—a construction project of some importance and interest—is also a key in the plan to build up this part of the world as an economic barrier to Russian expansion. A State Department statement some weeks ago disclosed that enterprises involving up to $3 billion over the next ten years have been discussed among the U. S. and the four major African colonial powers—Great Britain, France, Belgium and Portugal. At about the same time, ECA called attention to Abidjan as the African "port of the future." It also announced that for this work and other development in French West Africa, $31,000,000 in American goods and machinery had been allocated.

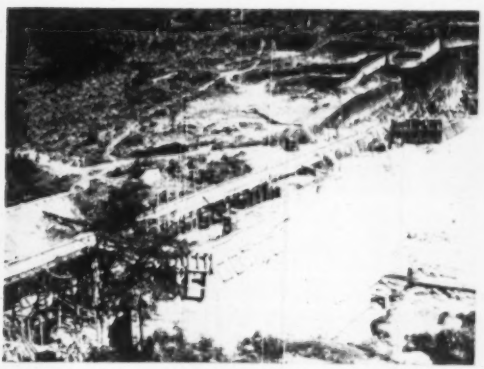
• **First stage done this year**—First stage of the work at Abidjan—opening a canal through a sand barrier beach so that ocean going vessels can enter the protected lagoon on which the town is located—will be completed this summer. It has required the dredging of 23,000,000 cu yd of sand, the placing of 1,000,000 tons of stone in jetties and the laying of 450,000 sq yd of bamboo fascine mattress. Planned to start by the end of the year, according to the French Colonial Office, is work on the quays on the island opposite the town. One, running in a northeast-southwest direction, will be about 1,000 ft long and will be used for the export of timber. The other, 2,000 ft long in a northwest-southeast direction, will handle exports of coffee, cocoa and bananas. Port volume in 1938, both exports and imports, was 345,000 tons; it is planned to equip it to handle 850,000 tons annually.

Attempts to pierce the sand barrier, so that ships would not have to anchor off-shore in the Gulf of Guinea and lighter goods ashore, date back to the founding of the town in 1900 when the railroad was built into the interior.

• **Earlier canals failed**—In 1906, an opening was made at the narrowest point, but rapidly filled with sand under the action of waves and the littoral currents. Another try in 1933 was likewise unsuccessful. In both instances the cut was made opposite a great "bottomless hole" in the gulf, which precluded the building of protecting jetties. Moreover, it was oriented so that the waves entered it directly, and it was too small in cross section to provide sufficient water volume to keep it free of sand. Hydraulic model studies showed the way to a practicable design that took care of all these shortcomings.

The new cut or canal is shown on the above map. It is nearly 9,000 ft long, it is 1,200 ft wide at the water surface and 650 ft at a depth of 50 ft. Its 4:1 slope banks are protected by weighted fascine mattresses, and similar mattresses are used at the entrance to form a sill. At the entrance, the canal is narrowed to about 500 ft and protected by jetties on either side. The west jetty, 1,700 ft long and 230 ft wide at the base, is essential to give protection from the ocean swells and the littoral currents. The east jetty is only 600 ft long, but is shaped to guide the waves away from the entrance.

Pictured below is construction work on the Abidjan-Niger R.R., which, with the new port, will do much toward economic development of West Africa.



FOR NAIROBI'S WATER SUPPLY—This concrete gravity construction is for the Ruiru Dam 17 miles from Nairobi, Kenya, East Africa. The dam is one of two being built to provide additional water for the rapidly growing city. It is designed to impound 700,000,000 gal. It will be 60 ft high. The work is being done by W. & C. French, Ltd., of Buckhurst Hill, Essex, England. (Eastern Publishers Service Photo.)

WEST AFRICAN RAILROAD—The Marshall Plan has allocated almost $31,000,000 in goods and equipment for the development of French West Africa, an area more than half as large as the United States. Above is construction work on the Abidjan-Niger R.R. between Bobo-Dioulasso and Ouagadoougou. Steel ties are used as termites, which abound in that district, won destroy wooden ones.

When you're running into piles of difficulty, here's the extractor you always can depend on. It has the extra power, the extra ruggedness, speed and efficiency to extract any type of pile and to pull you through a difficult project on schedule. It's really a time saver. And remember . . . time saved is money saved.

The Vulcan Pile Extractor is simple in construction and easy to operate. It is built in three sizes for all extracting purposes—No. 200 for smaller work, No. 400 for heavier jobs and No. 800 for really tough jobs.

Write for complete details on the pile extractor that has proved itself in the field since 1927.

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MUNICIPAL AFFAIRS

A 22-mile expressway proposed for Richmond

A comprehensive expressway proposal is now being considered in Richmond, Va. The new plan, devised by Edwards & Kelcey, planning consultant employed by the City Planning Commission, is for a 22-mile express highway system to cost at most $46,445,000 and 10 to 15 years to complete.

The plan differs somewhat from one prepared by the State Highway Department four years ago and on which no positive action has been taken.

In brief, the new plan would take the expressway through the city from north to south about on the same lines as the highway department plan of 1946, including a Lee Bridge crossing of the James River.

The east-west route, starting from Route 250 on the west and going across town to Route 60 on the east, also follows the state plan in general.

However, a radical difference is a West End interceptor loop west of Belt Line, to catch traffic coming downtown from the far West End, and carry it around, rather than through, the heavily-populated near West End residential area.

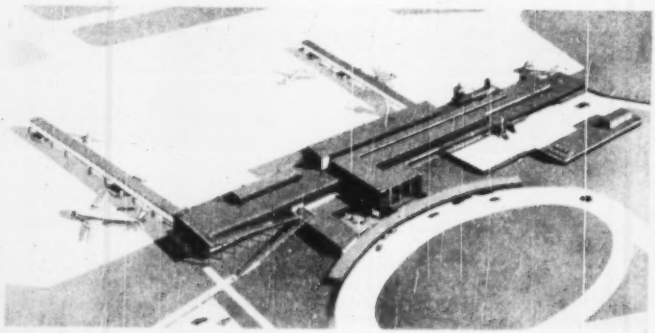
Another new idea is a plan for a new South Street bridge to feed traffic directly from the South Side into the central business district. A third innovation is to take the north expressway approach to Lee Bridge along Madison Street instead of along Belvidere next to Monroe Park.

City Manager Reeder says that the city's share of the total cost should run about 25 percent, or about $11,500,000. Under present arrangements, federal, state and local government would split right of way costs one-third each. The federal government would pay one-half of construction costs and the state and city 25 percent each.

It is said that there is likely to be considerable discussion by all groups in the city before any definite action is taken on the expressway proposal, which has proponents and opponents. The Richmond **News Leader**, how-

(*Continued on page 61*)

MILWAUKEE SPORTS ARENA—This view shows the nearly-completed $1,500,000 sports arena for Milwaukee, Wis., scheduled to open this month. It will accommodate 11,000 spectators.—Wide World photo.



PHILADELPHIA AIRPORT—Above is a reproduction of the architects' drawing for the $5,000,000 terminal building to be built at the Philadelphia International Airport. Architects are Carroll Grisdale & Van Alen. Bids are being received by the Philadelphia Department of Public Works.

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Truscon Series 138 Double-Hung Steel Windows in Garth Woods Apartments, Scarsdale, New York. Geo. F. Pelham, Architect. Frank Morrell Construction Co., Inc., Contractors.

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Truscon specialized formed-steel frame and sash construction builds high strength into these steel windows of pleasing design. This form of construction assures structural rigidity, and freedom from depreciation. Truscon Double-Hung Steel Windows have fingertip control with motor type spring balances, complete factory weatherstripping in stainless steel, solid bronze lever lift handles and sweep lock. And, of course, there are the traditional Truscon Steel Window features of no warping, sagging, binding or sticking. No rotting and necessary replacement. For residential and commercial use, in a wide range of types and sizes. Free illustrated literature on Truscon Series 138 Steel Windows on request.

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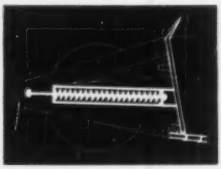
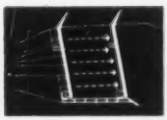
Heaped load (1:1 slope)	24.5 cu yd
Struck load (line of plate)	19.2 cu yd

Positive Ejector Gate Return



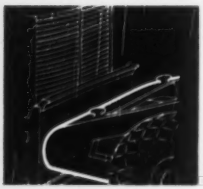
Six heavy duty springs (compressed during ejection) return gate to digging position when cable is released.

Positive Forced Ejection

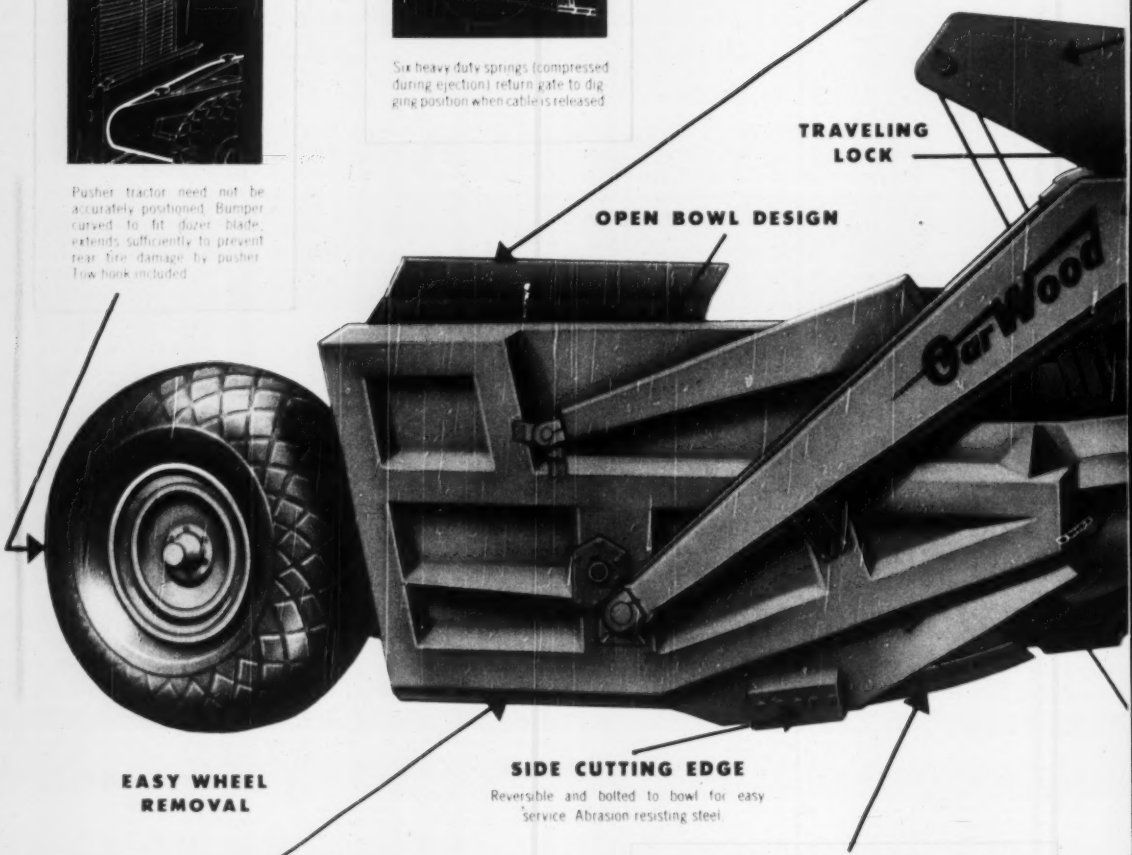


Ejector gate wipes bowl sides and bottom clean as it rolls forward to positively eject all material. Rate of ejection is controlled.

Wide Pusher Bumper



Pusher tractor need not be accurately positioned. Bumper curved to fit dozer blade, extends sufficiently to prevent rear tire damage by pusher. Tow hook included.

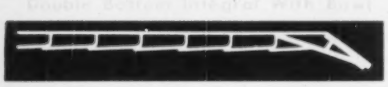


EASY WHEEL REMOVAL

SIDE CUTTING EDGE

Reversible and bolted to bowl for easy service. Abrasion resisting steel.

Double Bottom Integral With Bowl



Maximum strength and rigidity are provided by all welded construction of the double bottom with bowl sides and back.

Bowed 3-Piece Reversible Cutting Edge

For easier, faster digging and maximum economy. End sections interchangeable as well as reversible. Optional center extension cutting edge for hard digging.

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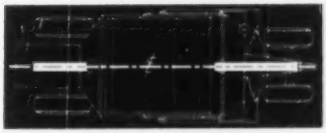
SCRAPER = New Low Costs Per Yard

All Sliding Sheave Blocks on Center Line of Scraper

Simplified and improved reeving lengthens cable life. To keep out dirt, sheaves are completely enclosed in boxes with hinged tops for easy accessibility when servicing.



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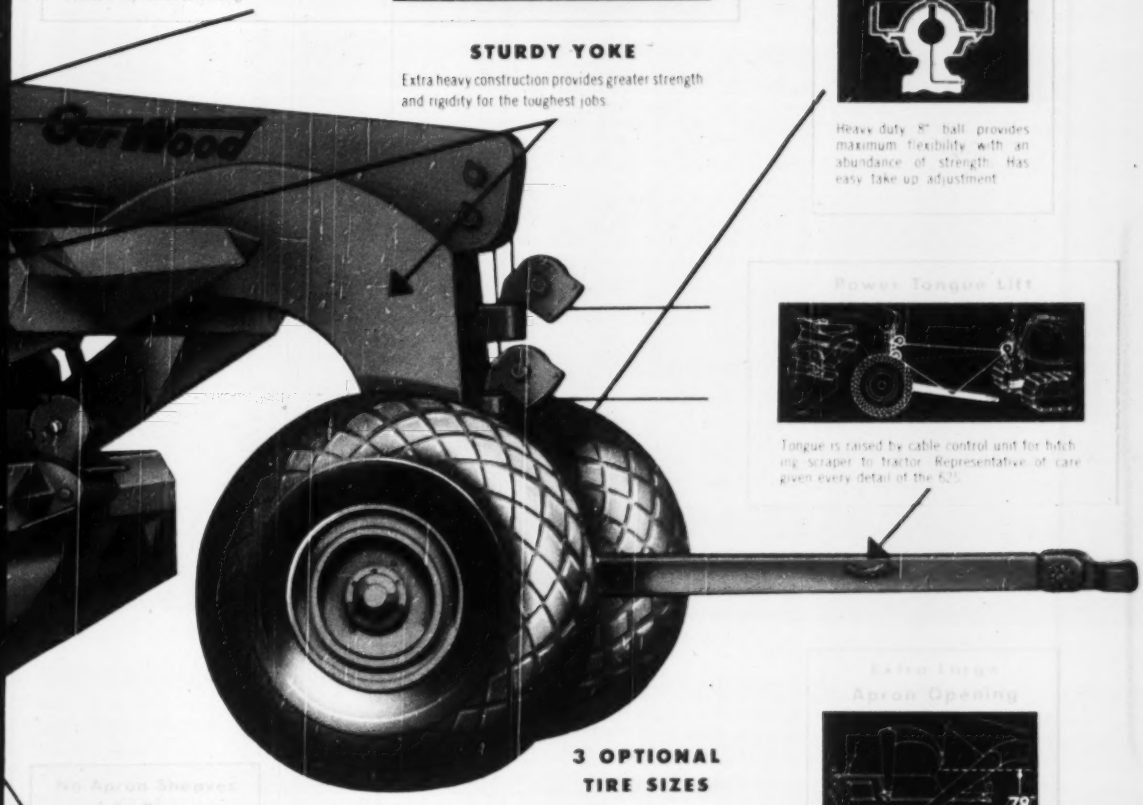
Extra heavy construction provides greater strength and rigidity for the toughest jobs.

Rugged Ball-and-Socket Fifth Wheel

Heavy duty 8" ball provides maximum flexibility with an abundance of strength. Has easy take up adjustment.

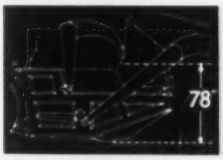
Power Tongue Lift

Tongue is raised by cable control unit for hitching scraper to tractor. Representative of care given every detail of the 625.



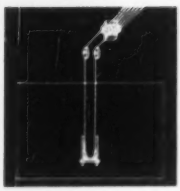
3 OPTIONAL TIRE SIZES

Extra Large Apron Opening



78" apron opening with scraper in carry position is ample for positive ejection of sticky materials and large rocks.

No Apron Sheaves In Dirt



Twin cable lines run from traveling sheave block to the apron equalizing hook. No sheaves in dirt.

EASIER TO SERVICE

All parts requiring service are quickly and easily accessible. Need for service has been reduced to a minimum.

Exceptionally Rugged Construction Throughout

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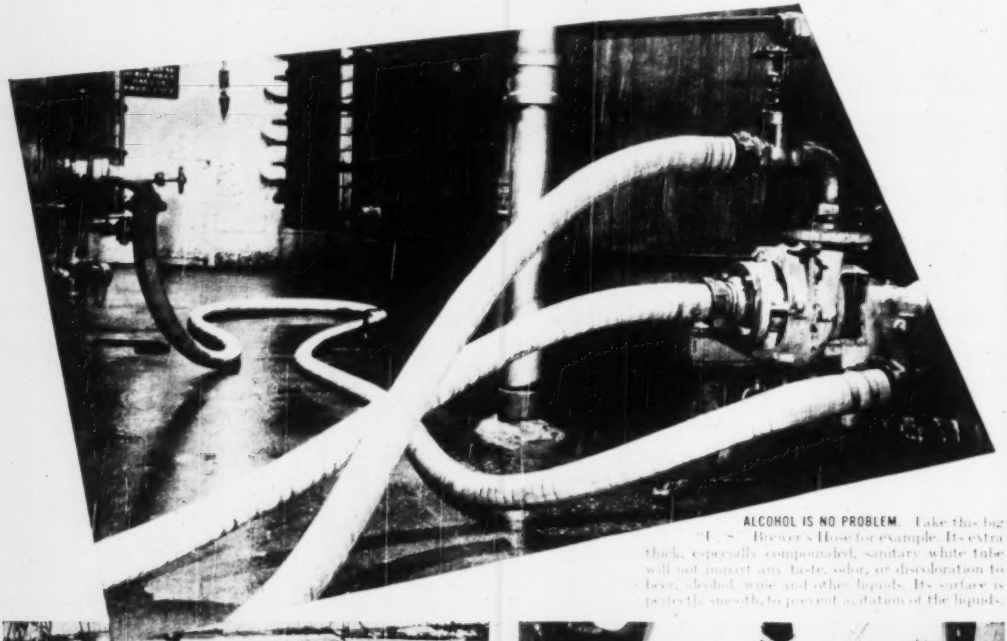
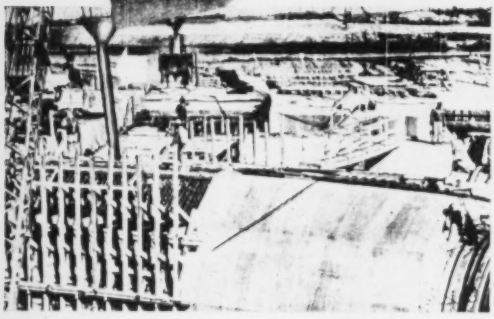
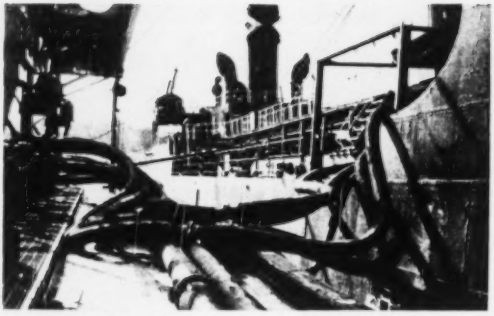


ALCOHOL IS NO PROBLEM. Take this big "U. S." Brewer's Hose for example. Its extra thick, especially compounded, sanitary white tube will not impart any taste, odor, or discoloration to beer, alcohol, wine and other liquids. Its surface is perfectly smooth, to prevent agitation of the liquids.



ON THIS BIG DAM in the Middle West contractors used U. S. Elephant Trunk Hose for dropping concrete speedily and efficiently into tight forms and inaccessible places. Such is the hose's flexibility, it can be maneuvered and bent into spots where concrete could not be dropped directly.



RESISTANCE TO PETROLEUM OILS is built into U. S. Oil Hose for suction or discharge work at refineries, terminals, and loading or unloading tankers or barges. The special U. S. constructions combine adequate pressure resistance and durability while allowing required flexibility.

United States Rubber Company makes hose that resists powerful acids, paint and chemicals of many kinds. No matter what your hose problem may be, you can be sure that "U. S." technicians either already have the right answer, or will obtain it for you. Write

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ever, has come out strongly for an early decision in the matter. Public hearings are being held this month. At the first hearing on April 15, considerable opposition was expressed and decision on the matter was postponed.

Municipal Briefs

Planning for Wilmington—One of the first objectives of the New City Planning Committee of Wilmington, Del., is the drawing up of a master plan to direct future growth of the city. Specific aims are to improve approaches to the southern part of the city, bettering substandard areas to make them revenue producers, enlargement of the municipal building, anti-smoke work, study of likely neighborhoods for secondary business centers, and extension the city boundaries.

New bridges for Dallas—The city and county of Dallas, Tex., are planning two large new bridges over the Trinity River to be built with money recently voted in a $22,500,000 county-city bond issue. One of the bridges will restore the broken traffic link between Hampton and Inwood Roads. The other will replace the wholly inadequate Fourth Avenue bridge which carries a heavy traffic between Dallas and South Oak Cliff. There are five other crossings of the Trinity within the city and all carry heavy traffic.

Long view for Akron's schools—Public school buildings of Akron, Ohio, need a $20,000,000 overhauling to provide adequate facilities for children in the next 50 years, according to an 18-month study of the school system by the Bureau of Educational Research of Ohio State University. Additions and new schools would cost $18,418,582, and remodeling would cost $1,675,500.

Rehabilitation program—A $5,135,000 program of rehabilitation and construction of bridges, streets and public buildings in Buffalo, N. Y., was outlined for the capital expenditures committee by Frederick W. Crane, commissioner of public works. The Crane program included $1,500,000 for repaving and resurfacing streets, and $1,750,000 for repair and construction of bridges. Mr. Crane said that $900,000 allocated for construction of viaducts in the present fiscal year has not been spent because plans and specifications are not ready.

Boston Common again—The latest word is that, unless unexpected obstacles are encountered, work on the $10,000,000 garage under the famous Common of Boston, Mass., will get under way in the coming summer.

Write for desk size sample and NEW Grating Catalog containing photographs of actual installations and valuable engineering data.

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PIPE COUPLINGS AND FITTINGS

Master plan for Lockport—A master plan for development of a 7.3-mile arterial route system for Lockport, N. Y., has been presented to that city and Niagara County by the N. Y. State Department of Public Works. Estimated to cost $2,871,000 at current prices, the proposed plan provides scientifically-designed highway facilities in Lockport and its environs to remedy traffic troubles that now threaten the economic future of the community. The city would have to pay about $104,000—one half the cost of the required right of way. All other costs would be borne by the state.

Two disposal plants—Asheville, N. C., is planning a long-range program to expand its sewage disposal system at a cost estimated at $2,250,000, and to include construction of two disposal plants—one on each side of the French Broad River—and construction lines to carry sewage to the plants from the 36 outfalls in the city.

Wider streets—A plan to set new building lines so that wider streets may be developed in the uptown area of Atlanta, Ga., is being considered. The plan proposes no immediate widening work, but would provide that any new structures would be set back far enough to permit eventual changes.

New Trenton bridge—The Delaware River Joint Toll Bridge Commission will have to buy 190 properties for approaches to the proposed toll bridge across the Delaware River between Trenton, N. J., and Morrisville, Pa. For this purpose more than $2,000,000 has been advanced by a Philadelphia bank on bond anticipation notes.

Expressways—At least two other southern cities besides Richmond, Va., are considering very extensive express highway work. At Houston, Tex., between $20,000,000 and $50,000,000 worth of new urban expressways have been approved officially by the state highway department—subject to certain conditions. Houston will have to provide necessary right of way and other facilities. The new construction program will follow completion of the Gulf Freeway and the proposed new Highway 59 entry from the north. At Louisville, Ky., the Railroad Planning Commission is hastening to get before state and U. S. highway officials the preliminary draft of an $81,000,000 long-range program of expressways, grade-crossing eliminations, and centralized railroad facilities. It is an integration of all previous plans to eliminate the city's traffic headaches. Plans are being drafted by De Leuw, Cather & Co., Chicago.

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GREATER VALUE *than ever!*

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Chevrolet—and only Chevrolet—leads the field in popularity, performance, payload and price. Chevrolet—and only Chevrolet—has earned the right and proved its right to leadership.

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Out in front with all these PLus *Features:*

• TWO GREAT VALVE-IN-HEAD ENGINES: the New 105-h.p. Load-Master and the improved 92-h.p. Thrift-Master—to give you greater power per gallon, lower cost per load • THE NEW POWER-JET CARBURETOR: smoother, quicker acceleration response • DIAPHRAGM SPRING CLUTCH for easy action engagement • SYNCHRO-MESH TRANSMISSIONS for fast, smooth shifting • HYPOID REAR AXLES—5 times more durable than spiral bevel type • DOUBLE-ARTICULATED BRAKES—for complete driver control • WIDE-BASE WHEELS for increased tire mileage • ADVANCE-DESIGN STYLING with the "Cab that Breathes" • BALL-TYPE STEERING for easier handling • UNIT-DESIGN BODIES—precision built.

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The public's overwhelming preference for Chevrolet trucks is proof of owner satisfaction earned through the years. Beyond question, Chevrolet P•L trucks are the nation's leading choice in the entire truck field.

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From low selling price to high resale value, you're money ahead with Chevrolet trucks. Chevrolet's rock-bottom initial cost—outstandingly low cost of operation and upkeep—and high trade-in value—all add up to the lowest price for you.

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HOW TO HANDLE ANY RIGGING JOB

• effectively
• safely

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MEET [illegible] construction rigging with this complete handbook. Use it as your guide to safe and efficient rigging methods and techniques for transporting or handling heavy machinery or materials [illegible] maintenance operations [illegible] erecting or dismantling steel or wire structures.

This book explains how to do the job quicker, safer at lower cost. It shows how to determine the weight of a load, and describes equipment and techniques best suited to its transportation or hoisting. It explains applications, illustrates construction details, gives maintenance tips for all kinds of rigging equipment; shows how to use, inspect and maintain fiber and wire ropes, slings, scaffolds, [illegible] hoists, cranes and derricks, chain hoists, etc.

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HANDBOOK OF RIGGING

By W. E. ROSSNAGEL

Safety Engineer, Consolidated Edison Co. of New York, Inc.

321 pages, 6 x 9, over 300 illustrations, $4.75

PACKED into the pages of this guide are proven methods that can help you perform your job with greatest safety to all concerned. The book includes simple formulas useful in the accurate calculation of loads and forces. It provides a wealth of data on wire rope installations, and covers every step in rigging operations from rigging a swinging scaffold and painting a steel stack to using a hydraulic jack and operating a hoist. Reference codes, laws and standards are listed to help you ensure that there will be no violation of local laws, no deviation from safe practices.

Shows how to:
- lubricate wire rope
- rig a basket-hitch sling
- test planks for scaffolds
- operate a spur-geared hoist
- use a suspended scaffold on heavy repair jobs
- test a jack
- and many, many others

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MEN AND JOBS

H. H. Morgan, vice-president and chief engineer of the Robert W. Hunt Co., engineers, Chicago, Ill., in addition, has been appointed as general manager.

Kenneth P. Norrie and L. C. Campbell, consulting engineers of Spokane, Wash., have formed a partnership. Norrie obtained his master's degree from the University of Wisconsin in 1939, was an officer in the Seabees and worked on dam design and flood control studies with the Army Corps of Engineers before becoming assistant professor of civil engineer at Gonzaga University in Spokane. Campbell was with the Burns & McDonnell Engineering Co. and the Ulrich Corp. before moving to Spokane, where he has been working with architects.

Francis Bennett has resigned as senior planner for the Columbus, Ohio, Plan Board, to be senior planner in Detroit, Mich.

W. H. Kyle, civil engineer, general manager of the central region, Canadian National Railways, has been appointed assistant vice-president, operations, at system headquarters, Montreal. He is a 1926 graduate of McGill University.

Bradford V. Bevier, Mansfield, Ohio, city sanitary engineer since 1947, has resigned.

Robert Drummond of Toronto, Ont., is the new president of the Canadian Construction Association, whose activities extend all over the dominion. He has been national vice-president of the organization, and also president of the Toronto Builders' Exchange. Of Scottish birth, Mr. Drummond went to Canada as a boy. At the age of 25 he was in charge of administration of construction of the Canadian Bank of Commerce building in Toronto, the tallest skyscraper in British Commonwealth.

Roy E. O'Mara, vice-president of the Allegheny Asphalt & Paving Co., Inc., of Pittsburgh, Pa., has been elected president of the Constructors' Association of Western Pennsylvania. Mr. O'Mara was vice-president for the highway division last year and served on the labor committee.

At the recent convention of the American Concrete Institute at Chicago (ENR March 2, p. 27) Herbert J. Gilkey, left, outgoing president, posed with the newly-elected president Frank H. Jackson, of the Bureau of Public Roads, Washington, D. C.

"DEPENDABLE... on Burning Sand or Mountain Pass!"

HIS OUTFIT IS JUST FINISHING A DESERT PROJECT WHERE THE TEMPERATURE REACHED 110. NEXT WEEK HE MOVES TO A ROCKY MOUNTAIN PASS - HIGHEST ELEVATION, 10,057 FEET. THAT'S WHY HE USES GARDNER-DENVER PORTABLES. THEY KEEP WORKING ANYWHERE.

Gardner-Denver Portable Compressors are available in sizes from 105 to 500 cu. ft. actual capacity.

Ask the men who go after the big jobs—the tough jobs! They'll tell you that two-stage Gardner-Denver Portable Compressors assure full capacity air at *any* altitude—under *all* weather and temperature conditions. Completely water-jacketed cylinders eliminate cold, unlubricated starts—require no "cooling off" periods even in torrid desert heat. For better compressor performance—all the time—choose Gardner-Denver!

USE COMPRESSED AIR FOR SAFETY CONVENIENCE FLEXIBILITY

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Gardner-Denver Company, Quincy, Illinois

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Deliver twice the volume of the Arkansas River *with One* ECONOMY PUMP

200,000 gallons a minute can be delivered by one Economy Axial Flow Pump! That's double the mean discharge of the Arkansas River at La Junta, Colo.

For any high capacity, low head application, these pumps are ideal. Operating at high speeds they are light in weight and low in cost.

Installation is simple and inexpensive. No dry well is needed. Just drop pump into channel or wet well and connect Dresser coupling at discharge. It is not even necessary to accurately align piping.

Three general types are available: Light Duty for irrigation uses; Standard Duty for flood control; and Heavy Duty types for continuous service, such as condenser circulation. A special Heavy Duty "Pull-out" type is built to allow removal of shaft and rotor without disturbing piping.

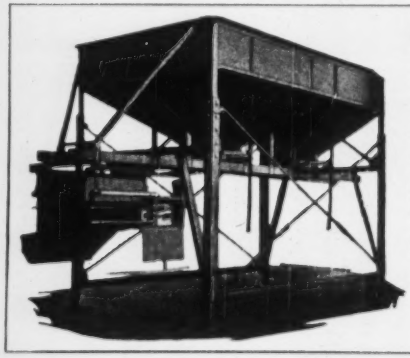
Economy Axial Flow Pumps are made with either oil or grease lubricated bearings, water lubricated rubber bearings, and open or enclosed shafts. Capacities range from 1,000 G.P.M. to 200,000 G.P.M. at heads up to 75 ft.

For complete details, write Dept. — CB-4, for Bulletin No. G-845.

Centrifugal, Axial and Mixed Flow Pumps for all applications.

Economy Pumps Inc.

DIVISION OF HAMILTON-THOMAS CORP., HAMILTON, OHIO



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Bruce M. McDill, engineer-in-charge of the stream pollution unit of the Ohio State Health department, displays the mobile laboratory recently put into operation by the department.

L. R. Schofield, principal assistant engineers, and John R. Grandinetti, mechanical engineer, both of the Bureau of Engineering, Surveys and Zoning, check construction details for Philadelphia's Northeast sewage treatment plant.

Left to right, are C. S. Cotton, chief inspector for the District of Columbia Department of Highways, Washington, D. C., on the South Capitol St. bridge construction, L. Jones, inspector, and R. D. Wallace, resident engineer.

Prominent in the construction of Morelos Dam on the Colorado River just below the California border for the government of Mexico are Carl Larson, left, general superintendent, and A. G. Cadaval, vice-president and chief engineer, both of Morrison-Knudsen de Sonora, S. A. Reinforcing steel rising in the background represents preliminary work on the ribs of the diversion structure.

Gordon H. Bannerman of New Haven, Conn., a civil engineering graduate of Lafayette College and an expert on the construction of aerial tramways, has been made manager of wire rope, aerial tramways and suspension bridges for Columbia Steel Co., San Francisco, Calif.

C. W. Lewis, of Warrenton, N. C., supervisor of new road building projects in Warren County for the North Carolina Highway Department, has been transferred to Halifax County, with headquarters at Roanoke Rapids. With the highway department for 28 years, he was supervisor of maintenance at Warrenton for 12 years until recently placed in charge of new construction. He has been succeeded at Warrenton by **P. Powell** of Warrenton, and **H. M. Tharrington** has been named sub-supervisor there.

With the hiring of **Anthony P. Hamann**, former University of Santa Clara business manager, as city manager of San Jose, Calif., **Harold J. Flannery** will be able to return to his job as city engineer. Mr. Flannery in January took over as city manager for 90 days, when no one was immediately available to fill the post left vacant by **O. W. Campbell**, who resigned to become city manager of San Diego, Calif. Selected from a field of more than 40 candidates, Mr. Hamann had previously been considered as city manager in 1946, but the president of Santa Clara University was reluctant to release him from his contract.

George R. Prescott is resident engineer for the North Carolina Highway Department on the construction of a bridge across the French Broad River at Asheville, N. C.

John A. Beemer, retired Bureau of Reclamation engineer who pioneered in irrigation development and specialized in big dam construction, has been nominated by Commissioner Michael W. Straus for the Reclamation "Hall of Fame." He was in charge of the construction work on the 265-ft Alcova Dam in Wyoming, the 235-ft Deer Creek Dam in Utah, and the Anderson Ranch Dam in Idaho.

Edward Miller, South Logan, has become chief engineer of the Logan, Ohio, city waterworks, succeeding the late Charles Dalton.

Philip Partridge, assistant city engineer at Wilmington, Ohio, has been appointed Highland County engineer at Hillsboro, succeeding **Elmer S. Barrett** who had been serving temporarily.

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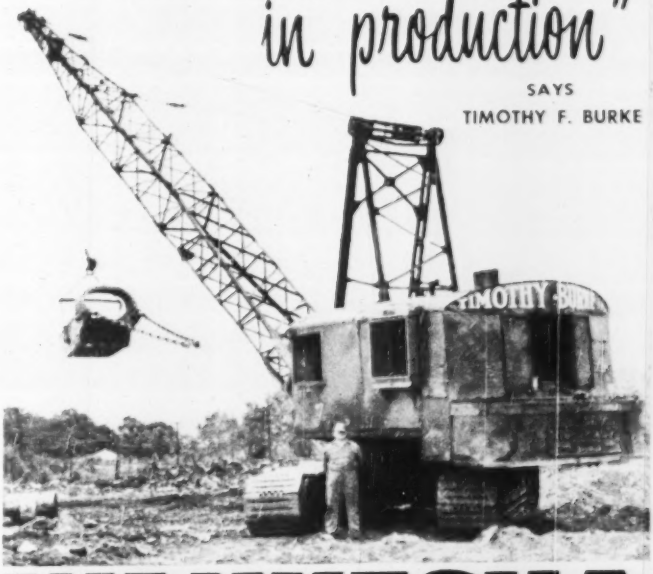
SAYS

TIMOTHY F. BURKE



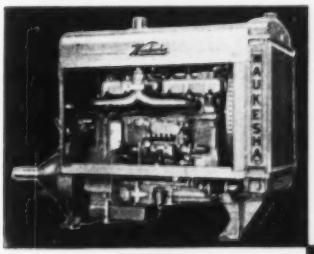
WAUKESHA

Diesel POWER

● Timothy Burke, Inc., of Scranton, Pa., have been excavating engineers for 67 years—in railroad and dam construction—and, for the past 32 years, coal stripping in the Anthracite region. Right now they're operating eighteen shovels and draglines. With their experience, they *know* a good engine when it comes on the job . . .

Here's what their Mr. Timothy F. Burke, Vice-Pres. and Gen. Mgr., says: "We installed a Model 148-DKU Waukesha Engine in our Northwest Model 85 Dragline to replace a gas engine of another make, and we are very pleased with the performance . . . We have noted a vast improvement in production, and with regards to efficiency and economy, we can say the results have been very satisfactory." Easy to start, too, these Waukesha Diesels, and smooth . . . snappily responsive to all power and load demands.

Auto Gear & Parts Company, Inc., of Philadelphia, conversion specialists, supplied this Waukesha Diesel and installed it. Ask your distributor about Waukesha Diesels. Send for Bulletin 1414.



Model 148 DKU WAUKESHA DIESEL—Six cylinders, 5¼-in. x 6-in., 779 cu. in. displacement, 180 hp. maximum.

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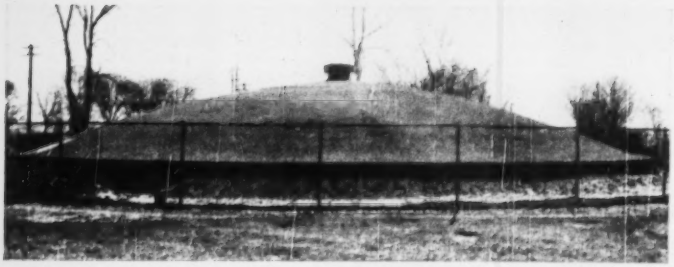


"GUNITE" DOMES FOR EXISTING RESERVOIRS

This photo shows one of the two "GUNITE" dome roofs built by us at Mattoon, Ill. in 1946 on tanks approximately 90' in diameter. The heavy "GUNITE" ring girders of the domes are reinforced with pre-stressed hoop rods. Similar domes have been constructed, by us, on existing brick reservoirs. "GUNITE" reinforcing was placed on the interior of the reservoirs and, when necessary, on the exposed surface above the ground to stop leakage and further deterioration.

We have built tanks of all "GUNITE" construction with capacities from 25,000 to 2 million gallons. Because of the imperviousness of "GUNITE" tanks, assured by our method of pre-stressing, they can be placed completely underground, on the surface or elevated with equal success. They are in use for storage of water, oil, chemicals and dry materials.

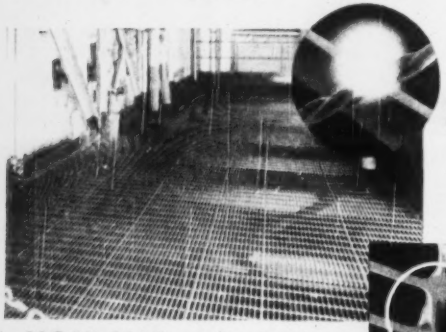
Write today, on your letterhead, for a free copy of Bulletin A 2400 which is illustrated with many examples of "GUNITE" for building and repairing tanks, bridges, buildings and other structures.

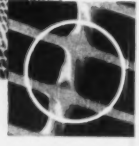
CEMENT GUN COMPANY
"GUNITE" CONTRACTORS
GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.

MANUFACTURERS OF THE CEMENT GUN

Rear Adm. Carl A. Trexel, CEC USN, has retired after 33 years in the Navy to become executive manager of the new International Marine Platform Constructors, San Francisco, which will construct offshore marine platforms for oil drilling and other purposes, utilizing a tapered design to resist deep water wave and surge action. Admiral Trexel helped develop artificial harbors used in the cross-channel invasion of Europe. Early in the war he was director of the Alaskan Division, Bureau of Yards & Docks. At retirement he was director of the Pacific and Alaskan divisions, and has been succeeded by Rear Adm. Lewis N. Moeller.

Electroforged into one piece for STRENGTH and SAFETY





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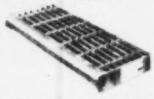

Blaw-Knox Electroforged Stair Treads available with rolled diamond checker plate nosing, twisted crossbar nosing or abrasive nosing.

NON-SLIP—the twist does the trick. Maximum safety and strength . . . that's the ideal combination in Blaw-Knox *electroforged* Steel Grating. Each individual joint is electrically forged together in a union stronger than the surrounding metal! The twisted bar construction gives a firm grip on shoe soles, makes slipping impossible.

WRITE FOR BULLETIN 2296

BLAW-KNOX DIVISION of Blaw-Knox Company
2001 Farmers Bank Bldg., Pittsburgh 22, Pa. Offices in Principal Cities

BLAW-KNOX ELECTROFORGED STEEL GRATING

S. B. Duckworth has been appointed vice-president in charge of western division operations of Thomas Bryan and Associates, Inc., constructors and engineers, Houston, Tex. A graduate of Missouri State College, he served from 1927 to 1940 as construction superintendent, Great Lakes Construction Co., Chicago. Later with John Griffith & Son Construction Co., he supervised construction of Navy bases and housing projects. In the war he was commander in the U. S. Navy, in charge of barracks and other military construction.

C'MON, IT'S HERE... THE NEW P&H 955-A!
NO MORE FRICTION SWING CLUTCHES FOR ME...TRA-LA!
SEE THOSE FAST STOPS AND STARTS? WITH HYDRAULIC CONTROL SHE'S SMOOTHER ALL AROUND
BOY! THIS IS IT! MAGNETORQUE* ELECTRIC SWING ON A 2½ YARD SHOVEL
IT'S A CONTRACTOR'S DREAM FOR BIGGER YARDAGE...LOWER COSTS, TOO!
RUGGED? THIS BABY HAS IT.. JUST LIKE THE 1055!
P&H

Yes, the new 955A is a standout. And almost a sellout, too! This 2½ yard shovel, a smaller version of the famous P&H Model 1055, can be shipped completely assembled. Lower digging costs in 2½ yd. capacity are important to you, so it's important that you check the P&H 955A right now. Get your copy of bulletin X-122 now!

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An ordinary design can be turned into a beautiful building by the specification and use of Medusa White Portland Cement in exterior stucco, white concrete, or architectural concrete units. It is, after all, the external building material that chiefly determines the appearance of the construction. Medusa White makes the ordinary the unusual . . . creates modern industrial buildings . . . distinctive public and commercial buildings . . . and pleasing mass-housing units . . . in striking white or lovely pastel colors. Here is a material that is plastic . . . Because of its plasticity, this original white cement can be used by the engineer or contractor to create almost any shape he desires. Medusa White, with waterproofing ground in at the mill, becomes Medusa Waterproofed White Portland Cement and repels water at the surface of the construction . . . We have prepared two booklets, "A Guide to Finer Stucco" and "Medusa White Portland Cement," to show you how to build beautiful buildings with this modern material. Write for them. Medusa Portland Cement Company, 1001-2 Midland Building, Cleveland 15, Ohio.

You can build **BETTER** *with*

MEDUSA PRODUCTS

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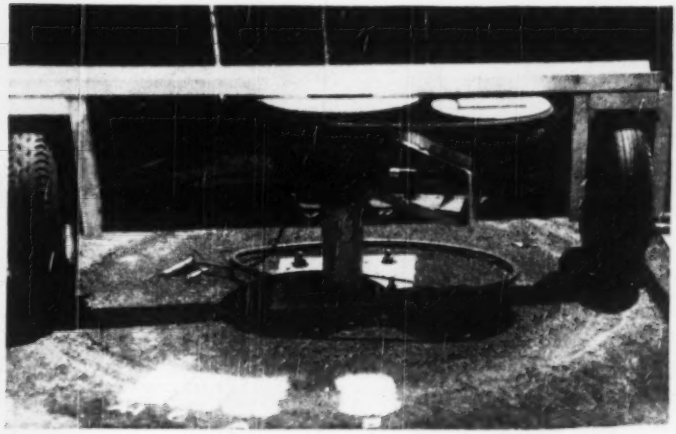
EDUCATION and RESEARCH



A SIMPLE DEVICE for testing the lasting qualities of road marking paints has been rigged up by the Los Angeles Bureau of Standards. Powered by a 1 hp motor, the machine revolves a set of 18-in. (o.d.) tires over paint samples 100,800 times in a 24-hour test period. If samples don't break down or wear off after 100,000 tire passes, city engineers accept the paint for road marking.

Paint tested is first applied to a steel panel by a doctor blade in a .01-in. coat. Panels then are allowed to dry for 18 hours and placed around the circumference of a 4-ft. circle described by the revolving wheels. The tires are leaned outward 2 degrees to make wearage even greater. Each wheel supports 67 lbs. weight. In the picture, the black on samples is rubber worn off from the tires, but paint on some of the panels is also seen to be breaking down.

Earthquake measuring

Earthquake measuring instruments will be incorporated in the foundations and columns of the new engineering building, University of California, at Los Angeles. The recording system was designed to measure effects of earth tremors on concrete, steel, and the structure's design.

Some instruments installed during construction will be placed as much as 32 ft underground. The equipment includes Carlson strainmeters, SR-4 strain gages, pressure gages, a seismograph, and an oscillograph.

Earthquake disturbances recorded on the seismograph will automatically set the other instruments working. The oscillograph, which will be electrically connected to all the instruments, will provide visual readings.

C. Martin Duke, assistant professor of engineering, is supervising installation in the building, now under construction. Duke will also head studies of readings from the various devices.

Educational Notes

Chi Epsilon officers—Dean C. L. Eckel, of the college of engineering at the University of Colorado, has been elected president of Chi Epsilon, national honorary engineering fraternity. W. E. Babcock, professor of civil engineering at the North Carolina State College, is vice president. Honorary members chosen are Charles Gilman Hyde, professor emeritus of sanitary engineering at the University of California, Berkeley, and David B. Steinman, consulting engineer, of New York.

Short courses—Under the direction of the college of engineering, Rutgers University (the state university of New Jersey) short courses for water and sewage plant operators will be offered as follows: Mar. 14-April 13, "Elements of Water Works and Sewage Disposal"; Sept. 12 to Oct. 19, "Water Works and Filter Plant Operation"; Oct. 24 to Nov. 30, "Sewage Disposal and Plant Operation." Cooperating are the N. J. State Department of Health, the N. J. section AWWA, and N. J. Sewage Works Association.

Building trades estimating—The North Carolina State College school of engineering has announced that it will offer four short courses on "Estimating for the Building Trades" at Charlotte, N. C., one night a week for 15 weeks. In addition to specific instruction, training also will be given in laws of contract, insurance, labor relations, architectural problems, and other topics of vital interest to the building trades.

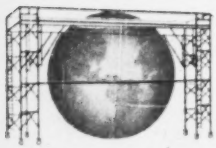
Faculty News

Alexander Faries has been named professor in charge of surveying at Indiana Technical College, Fort Wayne, Ind. Before coming to this country, he served as chief engineer in the department of city survey in Budapest, Hungary, and taught elements of surveying at the Technical University of Budapest. Robert C. Ruhl, head of the department of civil engineering, was recently appointed dean.

Frank A. Nikirk has taken a leave of absence as consultant on construction equipment for Milton Hale Machinery Co., New York, to serve as a visiting professor of civil engineering at the University of California, Berkeley. He will develop a course in construction engineering.

The appointment of eight new members to the engineering teaching staff of University of California Extension has been announced by E. M. K. Boelter, dean of the UCLA College of Engineering and head of Engineering Extension. They are: Michael V. Smirnoff, lecturer in engineering, University of California, teaching surveying; Charles P. Morgan, consulting engineer—reinforced concrete; John S. Rinehart—strength of materials; Donald P. Love, acoustical consulting engineer—acoustics for architects and engineers; Philip O'Brien, assistant in engineering, UC—corrosion and introduction to corrosion; James M. Lackey, district engineer, Asphalt Institute—design, production and use of asphaltic mixtures for contractors; and Ralph B. Wood, assistant to procurement manager, Holmes & Narver—construction supervision. All classes are taught in the Los Angeles area.

P. H. McGauhey, now on leave at the University of Southern California, will return Sept. 1 to head the department of civil engineering at the Virginia Polytechnic Institute, Blacksburg. He will replace R. B. H. Begg, who will retire after serving as head of the department since 1913. Mr. McGauhey, who will be professor of civil and sanitary engineering, took his degree of M.S. from the University of Wisconsin in 1941. He has just established a sanitary engineering department at the University of Southern California.



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No Bolts
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For getting up faster ... with no bolts to master, construction men the country over are now specifying Ezebilt Steel-Panel Scaffolding.

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Elections and Activities

This country is losing ground in efforts to provide adequate highways, according to H. A. Radzikowski, chief of the maintenance branch, Federal Bureau of Public Roads.

Addressing the eleventh annual highway engineering conference of the University of Utah, Radzikowski said 22 years would be needed at the 1949 rate of construction to correct existing highway deficiencies. Some $41 billion would be needed to correct present deficiencies, he said, "but in that time additional highways will wear out or become obsolete."

A. N. Carter, highway division manager, Associated General Contractors of America, reported the need for wider public support for road revenues, suggesting additional gasoline taxes where needed and bond issuance to obtain new highway construction funds.

Gerald E. Bith, planning engineer of the Wyoming Highway Department, suggested increased public participation in surveys preceding road building to better warrant construction expenditures. Utah State Road Commission Construction Engineer R. W. Griffin cited maintenance cost rises in the state from $561,437 in 1926 to $3,787,000 in 1949. Despite maintenance efforts, Griffin noted, 73% of Utah's federal aid primary roads are outmoded.

Wilmington, N. C., Contractors Association has elected officers: Frances Newton, President; Frank King, vice president and treasurer; Walter Carter, executive secretary; directors Luther J. Rogers, A. L. Simon, J. W. Hunter.

The Halifax, N. S., Construction Association has elected C. P. Roper president; G. M. Higen, E. J. Gillis and G. Miller, vice-presidents; E. A. Saunders, secretary-treasurer.

The Tile Contractors Association of America has elected James Scrichfano, New York City, president and Cecil J. Statt, Rochester, N. Y., vice president. H. R. Cole, Washington, D. C., was re-elected executive secretary and treasurer.

George W. Marx, Phoenix, chief sanitary engineer for the Arizona State Department of Health, is president of the Arizona Sewage & Water Works Association. Other officers: Stewart Henderson, Prescott, vice-president; M. T. Goudy, Phoenix, vice-president; and Mrs. Helen Rotthaus, Phoenix, secretary-treasurer. Directors: John Rancher, Tucson; A. W. Miller, Dario Travaini, Walter C. Hartford, and A. Anton Frederickson, all of Phoenix; and Clark Webb, whose home is in Safford.

Five engineers have been initiated into Tau Beta Pi, national honorary engineering society, at the University of Arizona. They are: Dario Travaini, superintendent of the Phoenix sewage disposal plant, and Harmon E. Keyes, consulting engineer, both of Phoenix; Eldred D. Wilson, geologist for the Arizona Bureau of Mines; Thomas R. Herndon, engineer with San Francisco del Oro Mining Co., a Mexican firm, and Harold C. Schwalen, head of the agricultural engineering department at the University of Arizona. Mr. Keyes was also honored for his electrolytic zinc research and for development of an autoxidation process for acid and iron sulphate production, and Mr. Travaini was honored for his extensive work in the field of Sewage treatment.

MAJOR MEETINGS

Third Inter-American Congress of Municipalities, New Orleans, La., May 2-5.

N. Y. State Society of Professional Engineers, Hotel Statler, New York City, May 4-6.

Pacific Northwest Conference, ASCE, Winthrop Hotel, Tacoma, Wash., May 5-6.

American Society of Civil Engineers, Pacific Northwest Conference, Winthrop Hotel, Tacoma, Wash., May 5-6.

Producers' Council, spring meeting, Washington, D. C., May 9-10.

Highways Conference, University of Florida, Gainesville, May 11-12.

U. S. Conference of Mayors, Waldorf-Astoria Hotel, New York City, May 11-13.

Florida Highway Conference, University of Florida, Gainesville, Fla., May 11-12.

American Water Works Association, Pacific N. W. section, Hotel Winthrop, Tacoma, Wash., May 11-13.

National Citizens Conference on Planning, Statler Hotel, Washington, D. C., May 16-17.

American Water Work Association, annual conference, Convention Hall, Philadelphia, Pa., May 21-26.

Society for Experimental Stress Analysis, spring meeting, Hotel Statler, Cleveland, Ohio, May 25-27.

Building officials Conference of America, Indianapolis, Ind., June 4-8.

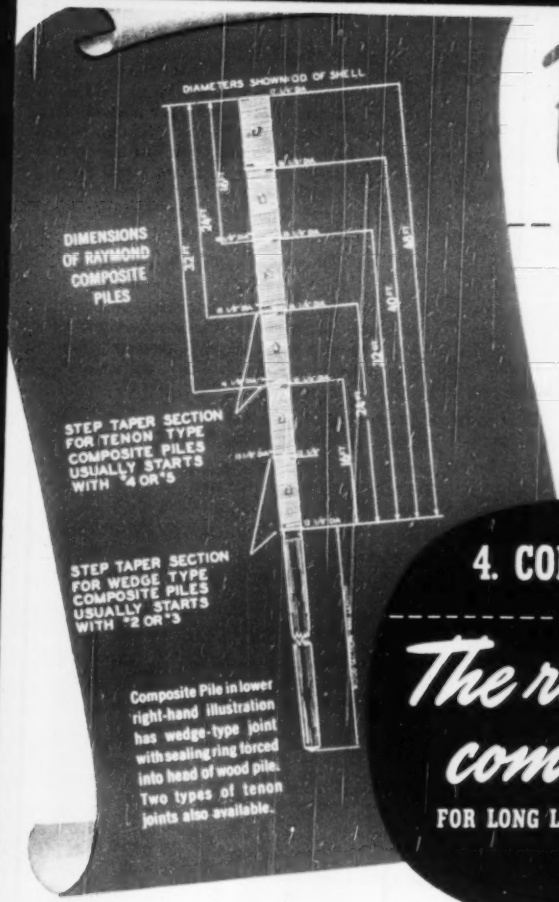
Central States Sewage Works Association, Hotel Lincoln, Indianapolis, Ind., June 9-10.

Western Association of State Highway Officials, Mapes Hotel, Reno, Nev., June 12-16.

Raymond MAKES 5 TYPES OF CONCRETE PILES

1. STANDARD . . . 2. STEP-TAPER . . .
3. PIPE STEP-TAPER . . . 4. COMPOSITE
5. GOW CAISSONS

Raymond installs every type of pile: cast-in-place concrete, precast concrete, steel pipe, wood and H-beam. Raymond operations include underpinning, borings and soil investigations, waterfront construction and harbor and river improvements; also cement mortar lining of pipes by the Centriline Corporation, a Raymond Subsidiary.


DIAMETERS SHOWN OD OF SHELL
DIMENSIONS OF RAYMOND COMPOSITE PILES
STEP TAPER SECTION FOR TENON TYPE COMPOSITE PILES USUALLY STARTS WITH #4 OR #5
STEP TAPER SECTION FOR WEDGE TYPE COMPOSITE PILES USUALLY STARTS WITH #2 OR #3
Composite Pile in lower right-hand illustration has wedge-type joint with sealing ring forced into head of wood pile. Two types of tenon joints also available.

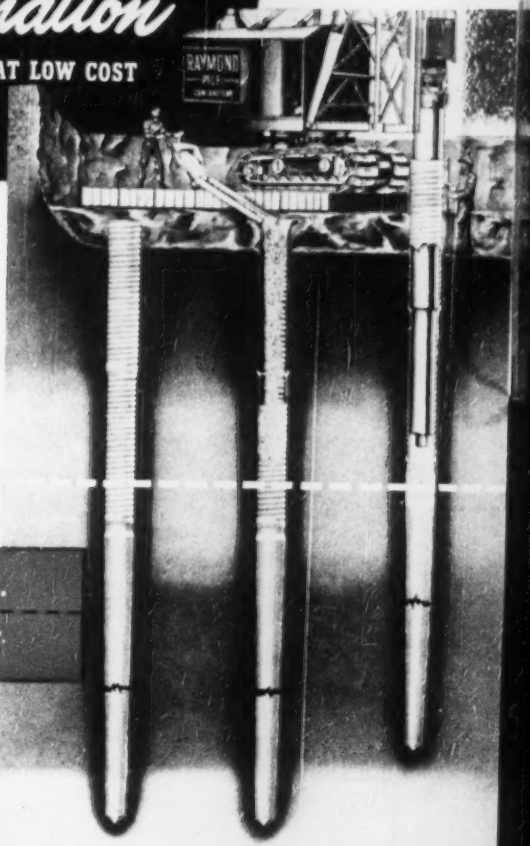
4. COMPOSITE PILES

The right combination

FOR LONG LENGTH AT LOW COST

Raymond Composite Piles are used for economy and long length. The concrete upper section extends from the permanent water table up to the underside of the footing, thus eliminating the expensive excavation, sheeting and pumping often required with wood piles.

Raymond Composite Piles have solved many deep foundation problems permanently and at minimum final cost. We shall be glad to advise you, without obligation, whether they are suitable for your project.



PERMANENT WATER LINE

RAYMOND PILES MAINTAIN DRIVING RESISTANCE

Raymond CONCRETE PILE CO.

140 CEDAR STREET, NEW YORK 6, N. Y.

BRANCH OFFICES: Boston, Syracuse, Philadelphia, Baltimore, Washington, Pittsburgh, Atlanta, Miami, Houston, Kansas City, St. Louis, Cleveland, Chicago, Detroit, Salt Lake City, Portland, San Francisco, Oakland, Los Angeles and principal cities in Latin America.

BOOM OF
MAYARI R
LIFTS BIGGER LOAD

Building concrete structure with Bay City truck crane. The 85-ft boom and 15-ft jib were made from Mayari R.

Recognizing the positive sales appeal of a truck crane that could lift more payload and place it higher, Bay City Shovels, Inc., studied the effect of using booms built from Mayari R low-alloy, high-tensile steel. They tried these booms on their cranes and found them far superior to the shorter, heavier booms of plain carbon steel. As a result, Bay City truck cranes equipped with Mayari R booms are today cutting erection time and racking up profits for progressive building contractors.

Bay City found that Mayari R provided 3 distinct advantages:

1. Because of its higher yield point and tensile strength, Mayari R allows them to decrease the deadweight of their booms, with the same lifting capacity; or make them longer, or increase their lifting capacity, without increasing deadweight.

2. The superior properties of Mayari R enable the boom to withstand the deflections occurring in such structures.

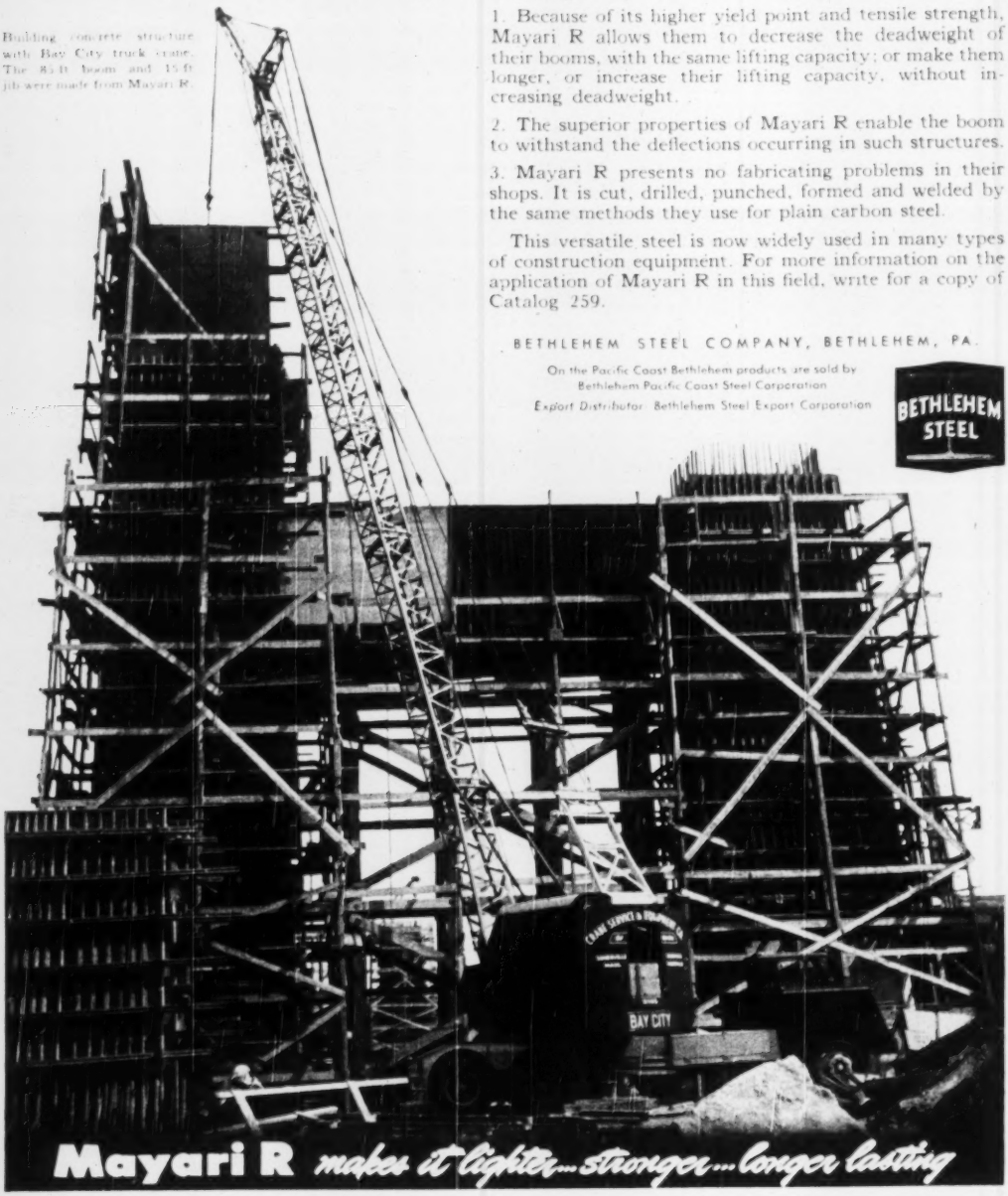
3. Mayari R presents no fabricating problems in their shops. It is cut, drilled, punched, formed and welded by the same methods they use for plain carbon steel.

This versatile steel is now widely used in many types of construction equipment. For more information on the application of Mayari R in this field, write for a copy of Catalog 259.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL



Mayari R *makes it lighter... stronger... longer lasting*

OBITUARY

C. A. Thompson, 45, founder and owner of the C. A. Thompson Construction Co. died in Nashville, Tenn., March 18. He attended the University of Tennessee School of Engineering at Knoxville. For 12 years he was an engineer with the Tennessee Department of Highways & Public Works, and for the last 14 years he had been owner and manager of his own company with headquarters in Centerville. His firm constructed many large highway projects in Tennessee, one of the largest being the new John Harlan Memorial Bridge across the Duck River at Columbia completed at an approximate cost of $800,000.

Duncan Hannigan, 78, a topographical engineer with the Geological Survey for 45 years, died at Washington D. C., April 10. In the first world war he was a captain in the Army Engineer Corps. He had retired from the Survey in 1943.

Wm. F. Thomas, 59, civil engineer, died April 8, at Aspinwall, Pa. He had been employed by the Allegheny County engineering department and by the Koppers Co.

Earl O. Mills, 55, planning consultant, died at Louisville, Ky., April 14. He had been a planning engineer for more than 30 years and was formerly president of the American Institute of Planning. In 1947 he was a special consultant on urban problems for the U. S. Chamber of Commerce in Washington, D. C.

Larry C. Lawrence, 48, engineer at the Veterans Hospital at Fayetteville, N. C., died April 10. He was a graduate of North Carolina State College and a native of New Bern, N. C.

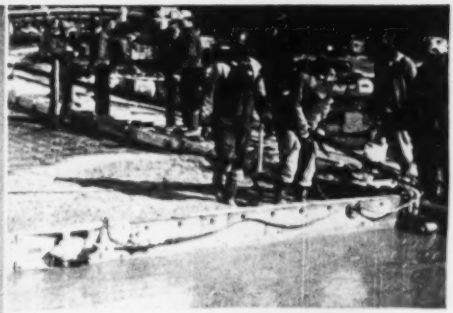
George E. Tiffany, Sr., 48, died at Omaha, Neb., April 10, chief engineer of the Clarkson Construction Co., from 1941 to 1946 he was a construction engineer for the Kansas highway department.

Robert T. Campbell, 63, city engineer of Brainerd, Minn., for 32 years, died recently.

Kirby V. Jones, of Charlotte, N. C., civil engineer with J. A. Jones Construction Co. for the last five years, died April 6. Mr. Jones participated in the building of the famous Ebro hydroelectric dam erected in Spain, the Grand Coulee Dam, and the Martin-Jordan hydroelectric dam in Alabama.

IT'S A "HUMDINGER"

FOR BRIDGE DECKS • MUNICIPAL PAVING • HIGHWAY WIDENING



MODEL M-1 POWER PLANT

Capacity 1.25 KVA. Other plants of 2.5 and 5 KVA. All have permanent magnet generators requiring no adjustment or maintenance. All generate both single phase and 3 phase 60 cycle, 115 volt AC.

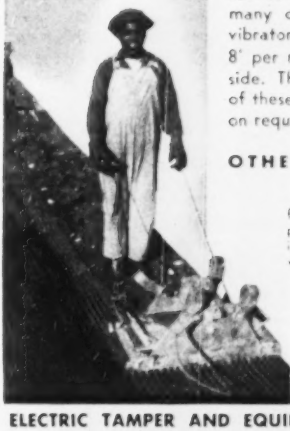
JACKSON PAVING UNIT

It consists of a manually guided, electric vibratory paving machine and portable power plant and will place upward of 65 cu. yds. of stiff mix concrete per hour; will undercut at side forms and curbs; strike off to crown (both regular and inverted;) roll back for second passes. Works right up to and around sewers, manholes and other obstructions. Quickly adaptable to any slab width from 6' up to any practical width. Has strong tendency to propel itself. Operators work from front, side or rear. Power Plant generates both single and 3-phase 60 cycle AC and may also be used for lights and operating other contractor's tools. Write for complete details.*

AND FOR THE FASTEST, handiest means of thoroughly compacting granular soils, investigate

THE JACKSON VIBRATORY SOIL COMPACTOR

This machine can be used to tremendous advantage in compacting granular backfill under factory floors, in trenches, bridge approaches, close to bridge abutments, alongside foundations, under footings, ramps, sidewalks, municipal pavements, loading docks; in compacting such granular soil as is used in earth fill dam construction and many other places. Delivers up to 4500 ½-ton vibratory blows per minute. Propels itself at 6' to 8' per min. One man can guide two units side by side. The Jackson M-1 Power Plant will operate two of these machines simultaneously. Complete details on request.*



OTHER MONEY-MAKING VIBRATORY EQUIPMENT

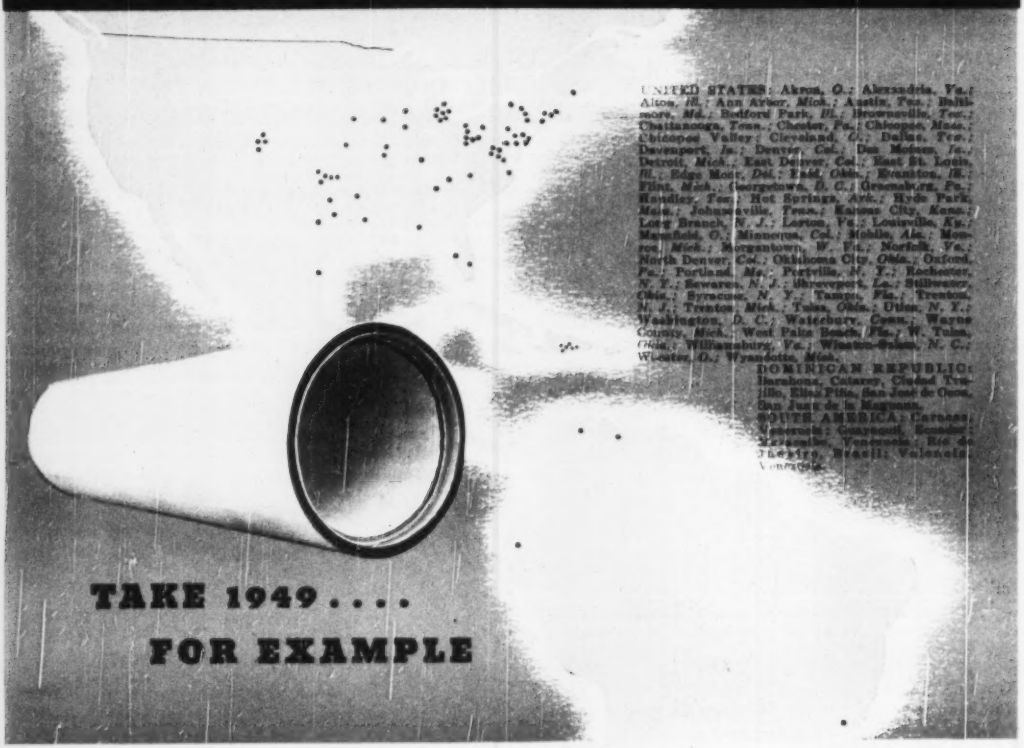
for vibrating full slab widths of highway and airport paving. Side Form vibrators for attachment to finishers and spreaders; mass and general construction vibrators ideally suited to each type of job.

*FOR SALE OR RENT at Jackson Distributors.

Write for the handy JACKSON "POCKET GUIDE" describing the complete line.

ELECTRIC TAMPER AND EQUIPMENT CO. • LUDINGTON, MICH.

Let's look at the record!


UNITED STATES: Akron, O.; Alexandria, Va.; Alton, Ill.; Ann Arbor, Mich.; Austin, Tex.; Baltimore, Md.; Bedford Park, Ill.; Brownsville, Tex.; Chattanooga, Tenn.; Chester, Pa.; Chicopee, Mass.; Chicopee Valley; Cleveland, O.; Dallas, Tex.; Davenport, Ia.; Denver, Col.; Des Moines, Ia.; Detroit, Mich.; East Denver, Col.; East St. Louis, Ill.; Edge Moor, Del.; Enid, Okla.; Evanston, Ill.; Flint, Mich.; Georgetown, D. C.; Greensboro, Pa.; Handley, Tex.; Hot Springs, Ark.; Hyde Park, Mass.; Jonesville, Texas; Kansas City, Kans.; Long Branch, N. J.; Lorton, Va.; Louisville, Ky.; Mansfield, O.; Missouri, Col.; Mobile, Ala.; Monroe, Mich.; Morgantown, W. Va.; Norfolk, Va.; North Denver, Col.; Oklahoma City, Okla.; Oxford, Pa.; Portland, Me.; Pottsville, N. Y.; Rochester, N. Y.; Sewaren, N. J.; Shreveport, La.; Stillwater, Okla.; Syracuse, N. Y.; Tampa, Fla.; Trenton, N. J.; Trenton, Mich.; Tulsa, Okla.; Utica, N. Y.; Washington, D. C.; Waterbury, Conn.; Wayne County, Mich.; West Palm Beach, Fla.; W. Tulsa, Okla.; Williamsburg, Va.; Winston-Salem, N. C.; Worcester, O.; Wyandotte, Mich.
DOMINICAN REPUBLIC: Barahona, Cotuey, Ciudad Trujillo, El Seibo, Elias Pina, San José de Ocoa, San Juan de la Maguana.
SOUTH AMERICA: Caracas, Venezuela; Caracol, Bonaire; Curacao, Netherlands West Indies; Maracaibo, Venezuela; Rio de Janeiro, Brazil; Valencia, Venezuela.
TAKE 1949 . . . .
FOR EXAMPLE

In 1949, Lock Joint Pipe Company supplied or contracted to supply reinforced concrete pressure pipe in 75 cities and towns throughout the western hemisphere. Completion of these contracts requires production of the equivalent of more than 75,000,000 inch-diameter feet of pipe, varying in size from 12" to 120" and designed for pressures varying from a minimum to better than 200 pounds per square inch.

In 1949, Lock Joint Pipe Company provided pressure pipe for installations from Portland, Maine, to Rio de Janeiro, Brazil, from Denver, Colorado, to Ciudad Trujillo in the Dominican Republic. And if past performance is any criterion, every installation will produce another "satisfied customer."

We will gladly refer you to any or all of the many federal agencies, state or county authorities, private water supply companies and industrial concerns which have installed Lock Joint Pressure Pipe during the last forty years. We are confident that their testimony will prove to be Lock Joint's best salesman.

For over forty years Lock Joint has specialized exclusively in the production and application of reinforced concrete pipe for water supply and distribution mains, sewers, storm drains, culverts and subaqueous installations.

LOCK JOINT PIPE COMPANY

P. O. Box 269, East Orange, N. J.

FRESNO, CAL. • ATLANTA, Ga. • Orange, N. J. • Kansas City, Kans. • Detroit, Mich.

BRANCH OFFICES: Casper, Wyo. • Cheyenne, Wyo. • Denver, Col. • Kansas City, Mo. • Valley Park, Mo. • Chicago, Ill. • Rock Island, Ill. • Wichita, Kan. • Kenilworth, N. J. • Hartford, Conn. • Tucumcari, N. Mex. • Oklahoma City, Okla. • Tulsa, Okla. • Hato Rey, Puerto Rico

LOCK JOINT
Reinforced Concrete
PRESSURE PIPE

UNIT PRICES BID BY CONTRACTOR

Water transmission main, Chester, Pa.

Alternate bids within alternates featured the bidding on $5.6 million, 209,000-ft. Chester-Harrison Hill Reservoir pipe line for Chester Municipal Authority Dec. 15, 1949. Albright & Friel, Inc., Philadelphia, are consulting engineers. Clarence E. Conner is executive manager for the authority.

Alternate Plan No. 1 called for pipe 42", 30", 36", 30" and 24" in diameter plus a pumping station not included in the Dec. 15 bidding. Alternate Plan No. 2 called for 48", 42", 36", 30" and 24" pipe and no pumping.

Each of these two plans was divided into 4 sections, so that contractors could bid on the job as a whole or on any or all of its sections.

Under each contract in each of the alternate plans, bids could be submitted for supplying or installing pipe or both, and bids could be on either of the following kinds of pipe: (a) reinforced concrete pressure pipe, (b) coated and lined steel pipe, (c) cement lined cast iron pipe.

When the smoke cleared and the permutations and combinations were worked out, 20 contractors had submitted bids on laying the pipe, 7 on the job as a whole, 2 more on all 4 sections separately, 2 on 2 sections and 9 on 1 section each. Four companies bid on supplying pipe, none on the cast iron alternate and only two on the entire job, both alternate plans, one on concrete and one on steel. These companies each bid also on each of the sections.

The awards went to concrete pipe on Plan 2 on bids for the job as a whole, work to start Jan. 16, 1950. Lock Joint Pipe Co., Ampere, N. J., will supply the pipe complete by May 23, 1951, for $3,599,617 and Berlanti Construction Co., Harrison, N. Y., will handle the field construction for $2,053,472 which must be complete by July 12, 1951.

The successful bid on the overall construction was 6% lower than the sum of the low bids on the 4 sections. On Plan 1, however, the low bid on the whole job was 10% higher than the sum of the low bids on the 4 sections. For supplying the pipe the steel bid was the only one for the whole job as for the sum of its parts. But the concrete pipe bid for supplying the whole job in one contract was $13,085 or 36% lower than the bids on the 4 separate sections.

The following unit prices are those bid on Plan 2 by the low and second low bidders plus selected unit prices from other alternates to fill in the record for sizes.

Alt. Plan 2 Furnishing Pipe

1. Lock Joint Pipe Co. (contract) — $3,599,617
2. Bethlehem Steel Co. — 3,864,327

500 days for delivery

Items		Quantity	Unit Prices 1. Concr.	2. Steel
48"	lf	130,848	$18.30*	$20.25
42"	lf	58,610	17.00	17.25
36"	lf	8,210	11.90	12.35
30"	lf	9,520	9.10	9.35
24"	lf	3,270	7.40	7.40
Corp. stop assemblies				
2"	ea	30	70.00	(20.00)†
1½"	ea	55	60.00	(28.00)†
¾"	ea	100	50.00	(20.00)†

* In alt. bids on 65,080 lf. & 65,768 lf. this was bid at $18.40

Prices in Alt. Plan 1 bid but not in Alt. 2

39"	lf	130,848	15.50	15.75
Corp. stops				
2"	ea	30	55.00	(45.00)†
1½"	ea	55	45.00	(23.00)†
¾"	ea	100	35.00	(11.50)†

† quoted from pipe-laying contractor's low bid on laying steel pipe, not a part of bid to supply steel pipe

Alt. Plan 2 Constructing pipe line

1a. Berlanti Constr. Co., Harrison, N. Y., contract — $2,053,472

2. Miele Constr. Co. & others, Newark, N. J. — 2,301,312

These unit prices are for trenching and installing concrete pipe. The low bidder bid identical unit prices all the way through for placing steel pipe except for corporation stops. On concrete pipe these were in the bids to furnish pipe, on steel pipe they were in the bid for installing pipe. The low bidder did not bid on laying cast iron pipe. The second low bidder also bid identical prices on trenching and laying concrete, steel or cast iron pipe except for the items "Installing Mains, 42", 48", 36", 30", 24"" and on these five items he bid $1 more on each unit price for steel and $2 more for cast iron than he did for concrete pipe.

Items		Quantity	Unit Prices 1a	2a
Trenching				
42" pipe				
0' & less	lf	19,000	$4.20	$2.75
8.5'–10'	lf	4,000	4.70	3.19
10.5'–12'	lf	700	5.00	3.55
12.5'–14'	lf	600	5.00	3.60
14.5'–16.5'	lf	500	5.50	14.00
16.5'–18.5'	lf	150	6.00	20.00
18.5'–20.5'	lf	150	10.00	30.00
48" pipe				
0' & less	lf	124,920	4.90	3.32
9'–11'	lf	4,000	5.00	4.29
11'–13'	lf	1,400	5.50	6.82
13'–15'	lf	900	5.50	10.00
15'–17'	lf	500	6.50	16.00
17'–19'	lf	90	14.50	24.00
36" pipe				
0' & less	lf	8,430	4.70	3.65
9'–11'	lf	940	4.80	4.50
11'–13'	lf	300	5.00	7.30
13'–15'	lf	270	5.50	11.00
15'–17'	lf	90	6.00	17.00
30" pipe				
0' & less	lf	3,200	4.70	3.26
8'–10'	lf	650	5.00	4.18
10'–12'	lf	270	6.00	7.30

Items		Quantity	Unit Prices 1a	2a
30" pipe cont'd				
12'–14'	lf	120	10.00	12.00
14'–16'	lf	80	15.00	20.00
24" P. S. & less	lf	3,270	6.85	2.20
Rock excav.	lf	82,500	1.00	1.00
Inst. mains				
42" pipe	lf	55,890	2.00	$ 4.40
48"	lf	129,930	1.50	4.60
36"	lf	8,210	1.00	4.45
30"	lf	9,320	1.00	4.40
24"	lf	3,270	1.00	3.95
Major Creek Xings				
16" A inst pipe				
42" $47.83	*230lf	ls	11,000	14,465
36.36	110lf	ls	4,000	7,850
33.33	120lf	ls	5,500	8,560
35.00	100lf	ls	3,500	7,140
39.86	70lf	ls	2,750	6,620
43.83	60lf	ls	2,750	6,510
47.92	240lf	ls	12,500	12,210
41.67	90lf	ls	3,750	5,610
41.67	90lf	ls	3,750	5,610
41.67	90lf	ls	3,750	6,490
37.50	100lf	ls	3,250	5,500
40.63	80lf	ls	3,250	5,390
50.00	75lf	ls	3,750	6,990
41.67	90lf	ls	3,750	6,600
41.30	115lf	ls	4,750	7,370
41.67	90lf	ls	3,750	5,500
41.67	90lf	ls	3,750	5,500
41.67	90lf	ls	3,750	5,500
41.67	90lf	ls	3,750	5,500
42.50	100lf	ls	4,250	6,490
50.00	130lf	ls	6,500	8,300
50.00	100lf	ls	5,000	7,920
48" 50.00	100lf	ls	5,000	3,900
42.86	70lf	ls	3,000	5,040
40.00	100lf	ls	4,000	5,600
40.63	140lf	ls	6,500	11,000
41.67	80lf	ls	3,500	5,500
43.75	80lf	ls	3,500	5,500
36.67	150lf	ls	5,500	9,420
63.63	160lf	ls	10,500	14,800
30" 41.67	120lf	ls	5,000	8,800
RR Xings				
P RR 42" 50	lf	ls	5,000	6,200
P Co 48" 118.	lf	ls	13,000	12,100
P RR 30" 80	lf	ls	8,000	7,150
Valve assemb.				
8" air rel.	ea		73 300.00	220.00
Comb 1" A. V.	ea		52 100.00	660.00
Blow off				
8" assembly	ea		21 300.00	200.00
6"	ea		26 300.00	145.00
4"	ea		20 250.00	115.00
CIP drains				
8" pipe	lf	1,050	5.00	4.00
6"	lf	1,300	5.00	3.50
4"	lf	1,000	5.00	3.00
CIP corner anchors				
For 42" pipe	ea	110	70.00	50.00
48"	ea	225	70.00	52.00
36"	ea	20	70.00	43.00
30"	ea	45	70.00	31.00
CIP corner for anchorage	cy	165	30.00	44.00
for bends	cy	655	30.00	37.00
Extra cover				
CIP	cy	125	40.00	44.00
CIA	cy	300	40.00	30.00
CID	cy	1,050	20.00	20.00
Timber, lge.				
Shoring	M fbm	115	90.00	200.00
Pipe cradle	M fbm	30	150.00	220.00
Gate valves				
24"	ea	3	2,000	1,800
16" & sle.	ea	1	2,000	2,000
12"	ea	1	250.00	330.00
10"	ea	4	225.00	140.00
8"	ea	1	150.00	100.00
6"	ea	1	150.00	75.00
House tobc.	ls		100.00	2,000
Fire hyds.	ea		300.00	250.00
6" CIP conn.	lf	120	4.00	4.50
Rdwy. paving, Bitml. concr.				
For 42" pipe	lf	65	15.00	14.00
48"	lf	50	15.00	14.00
36"	lf	25	15.00	14.00
Bitum. surf.				
For 42" pipe	lf	320	16.00	12.00
48"	lf	470	16.00	12.00
36"	lf	250	16.00	12.00
30"	lf	35	16.00	12.00
24"	lf	1,275	8.00	6.50
Surf. scrngs.				
For 42" pipe	lf	50	4.00	1.00
48"	lf	295	4.00	1.00
36"	lf	50	4.00	1.00
Addtl. paving				
Bitml. concr.	sy	50	16.00	20.00
Bitum. surf.	sy	165	10.00	16.00
Surf. scrngs.	sy	120	4.00	1.20
Temp. paving	sy	120	2.00	3.50
Pipeln. markers	ea	945	35.00	22.00
Transm. cables				
3/c" conduit	lf	25,000	0.75	1.00
4/c"	lf	50	2.00	1.00
Elect. pull box	ea	90	20.00	5.00
Creek tobc.				
W. Br. Chester Cr.	lf	600	10.00	5.00
Dump riprap	sy	125	10.00	5.00

* Low bid (1) per ft. lbp — $41 on plan

CONSTRUCTION REPORTS

Bids Asked—Low Bidders—Contracts Awarded

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.
ELSIE EAVES, Manager J. A. MAHONEY, Reports M. R. ROESSLER, Statistics

WATER SUPPLY

BIDS ASKED

Wis. South Milwaukee—B.A. $3.5—City, water filtration plant, pumping equipment, clearwell & elevated storage tank. Bids to Aldermanic Committee, City Hall, 6 P.M. Apr. 17. Engr. Bonnell & Saxe, Milwaukee. CD 3/24.

Tex. Anahuac—B.A. $3.5—City, WW, sys. extensions, $1,250,000. Howard & Kelly & Johnson, Consultants, Bldg., Houston. Engrs. CD 3/24.

Tex. Stamford—B.A. $3.5—City, W. & S. treatment, distribution & water supply improvements, $1,000,000. Bids to City Secy. Certified check or bond for 10% required. Plans deposit $25. Fisher & Nichols, Engrs., Fort Worth. CD 3/24.

Conn. Norwalk—B.A. $3.5—Sanitary Sewer Taxing Dist. of City of Norwalk, City Hall, improvements to water supply system, including new lake reservoir, intake structure, raising earth dam. Plans deposit $25. Bids, Sanitary & Water Dist. Apr. 19. Engr. [illegible]. CD 3/17.

Wash. Everett—B.A. $3.5—Water Dist. No. 1, Bids to Board of Commissioners, Apr. 17, for 2 deep well pumps, 1 submersible pump, 1 booster pump, 1 deep well motor, 1 submersible motor, 1 booster motor, 1 motor control center, 1 booster motor control center, 1 Ave. Chamber Valve & vaults. CD 3/24.

Tex. Abilene—Bids Apply—Municipal Improvement Dist. No. 1, water supply facilities. CD 3/24.

LOW BIDDERS

Tex. Kingsville—City, Apr. 4—W.W. system improvements. Engr. Pinkerton. $274,965.

CONTRACTS AWARDED

▲ Md. Baltimore—City Board of Estimates awarded $3,000,000 Bldg. Zone 1 Pumping Station & Filtration Plant Contract #2 to Fruin-Colnon Contracting Co., St. Louis, Mo., on its low bid of $2,066,000. Bids Apr. 4 reported CD 4/7.

Tex. Houston—South Park Development Co., 4660 Holmes Rd., water lines, facilities to J. R. Stewart & Son, Pasadena. Approx. $57,775.

SEWERS, WASTE DISPOSAL

BIDS ASKED

Nev. Madrid—B.A. $3.5—City, A. W. Murray, clk., Bldg. Bids to be opened at Council Meeting, May 2. Work to be completed within 60 days from date of contract. CD 3/24.

N. Y. Brooklyn—B.A. $3.5—Division of Bridges, Municipal Bldg., New York 7, N. Y., Apr. 19, for 2 sewer lines in Bay 7 Ave. from 23 to 60 St. CD 3/24.

† O. Brookville—B.A. $3.5—Veterans Admin., Veterans Adm. Center, Dayton 7, O., Apr. 5, for sanitary sewer, water & storm drainage, Bldg. 1. Spec. No. 508. CD 3/17.

N. Y. Rockaway—B.A. $3.5—U.S. Navy, Municipal Bldg., New York, Zone 7, buildings, structures and equip., Contr. 2, plumbing; Contr. 3, heating and ventilating; Contr. 4, electrical work, Rockaway Range Instrument Works, Floyd Bennett Field, Apr. 5. Spec. $10 each others. CD 11/24/49.

† Okinawa, Ryukyu Islands—B.A. Dr. Or. Amer. Dist. Engr., APO 331, San Francisco, Calif., water supply, primary treatment, 2.5 mg reservoir, underground clear well, chlorination laboratory, pumping & control house, in connection with an existing treatment plant, 250,000 gal. underground steel tank, reservoir, about 250,000 gal. elevated steel tank, approx. 12 mi. water distr. lines, reconstruction & align. approx. 20 highway, orchestration of roads, junction for mix high, 2 lanes, construct all drainage structures.

N. Y. Freeport—B.A. $3.5—Rd. Sewer Comm., Municipal Bldg., 46 N. Ocean Ave., approx. 24,000 lin. ft. 8 in. sanitary sewers with appurtenances, Baylis, Liberty & Sunrise Terrs., manhole appurtenant structures, pipe, support $25. Baldwin & Comerford, Engrs., 117 W. Sunrise Hwy. CD 3/24.

† Mass. West Roxbury—B.A. $3.5—Veterans Admin., Munitions Bldg., Wash., D. C., 7,500 lin. ft. storm water, Bldg. 16, Veterans Administration Hospital. Spec. No. 508. (Correction—Bid date.) CD 4/14.

† Tex. Kerrville—B.A. $3.5—Veterans Admin., Munitions Bldg., Wash., D. C., 7,500 lin. ft. storm water, Bldg. 16, Veterans Administration Hospital. Spec. No. 508. CD 3/17.

Calif. Los Angeles—B.A. $3.5—Los Angeles Sanitation Dist., 2 sewers in Maple Ave. between Slauson Ave. and Florence Ave. and in Florence Ave. between Maple Ave. and Long Beach Blvd. Approx. $1,000,000. Bids Apr. 5. Engr. Dist.

Tex. Abilene—B.A. $3.5—Municipal Improvement Dist. No. 1, sewage collection system. $1,000,000.

LOW BIDDERS

Calif. San Jose—Santa Clara Co. Contractors, Inc., Courthouse, Apr. 10, $4,000 lin. ft. w. to 24" w. city sanitary sewer in Hillsdale Ave. & Los Gatos Park Ave. $154,703. CD 3/27.

N. Y. Atlantic Beach, West Long Beach (town), Dist. Treas. Ha., hemstead, Apr. 4, sewage treatment plant from Prentice Comp., Inc., $38 N. 42 St., New York, Zone 18, $471,000. CD 3/14.

Pa. Schuylkill Haven—Schuylkill Haven Municipal Authority, Hall Schuyler, Haven, Mar. 30, sewage system from Hegins Center & Frailey Twps. to S.E.P.A. Plant, Phase 1, $132,662; drainage sys. in Frailey Twp., Phase 2, $43,200; and Ave. Harrisburg, Pa., $528,300. CD 3/9.

Tex. Dallas—City, City Hall, Water and Hawkins Sts., rejected bids No. 23 & 24 in sanitary sewer trunk from Greenville Reservoir to Northwest Hy. and Buckner Blvd. L. B. $548,203. CD 3/30. under LB.

Tex. Rowlett—City, Apr. 5, sanitary sewer, from Interstate Highway 30 to Forest Plainview. $52,745. Est. $50,000.

CONTRACTS AWARDED

O. Toledo—Todd Plater Products Corp., Alpena, Mich., complete sewer and Hamilton Wash. disposal garbage. Owner to be Approx. $100,000-$175,000. CD 3/24.

Tex. Houston—South Park Development Co., 4660 Holmes Rd., storm and sanitary sewers to J. R. Stewart & Son, Pasadena. Approx. $41,500 and Approx. $60,665 respectively.

BRIDGES

BIDS ASKED

Ont. Atwood—B.A. $3.5—C. Little, clk., Elma Twp., Atwood, 80 ft. concrete bridge on Side Rd. 5 and 6 Concession 10. Approx. $51,000. CD 3/24.

Mich. Detroit—B.A. $3.5—City Dist. P.W., Water Works Park, P.W. Bldg., Foot of East Grand Blvd. over Detroit River.

New Jersey—B.A. $3.5—New Jersey Turnpike Auth., Joint Meadows Rds., Newark.

Middlesex Co.—Middlesex Co. Improvement Authority, Perth Amboy, Apr. 5, for reinforced concrete structures between Prospect Plains Rd. and Ridge Rd. in Cranbury Twp.

Cleveland—B.A. $3.5—Cuyahoga Co. Engr., Courthouse, Apr. 5, for 3-1 45° Skew Reinforced Concrete Slab Bridge, Bridge No. 1 on Hellriegel Rd. over Big Creek. CD 3/24.

▲† N. M. Los Alamos—B.A. $3.5—Atomic Energy Comm., Los Alamos, 800 ft. open spandrel

PROJECTS COVERED

Projects—By Size

Classes of Construction

Stages Reported

Symbols and Abbreviations Include

†
▲
B.A.
ENR
CD

CONTRACTS AWARDED

Ohio—State Hy. Dept., Columbus, Zone 35, Type 1 and structure, span steel concrete Bridge No. GR-68-1.49, grading, paving, culverts & bridges on Rt. 68, Greene Co., to D. R. Sweeley & Sons, Inc., 424 W. Market St., Celina, $346,741. Est. $488,200. Type 7.32 and structures, 1 span concrete Bridge No. DA-47-60, 1 span concrete bridge No. DA-47-69, on Rt. 47, Darke Co., to Miller Bros. Construction, $57,836, est. $73,100. Type 7.35 and structure, 2 span steel Bridge No. BU-23-8.88, 2 span concrete Bridge No. BU-23-8.42, & 1.5, paving, grading, drainage on Rt. 23, Butler Co., to Joseph W. Vollmar, 10 Augusta Ave., Hamilton, $101,359, est. $122,400. Grand total $1,010,328. CD 3/15. Under Streets and Roads.

Iowa—State Hy. Comm., Ames, Apr. 11, 12,440.5 ft. steel truss bridge on Co. Trunk #2 [illegible] at Washington River, Crossing in Sect. [illegible], Prop. Mahaska Co., to Bridge Engineering Company, 1527 Maulsby Temple Bldg., Des Moines, $125,864.**** 5 reinforced box culverts and extens. and 1 14" pipe culvert with umbrella top intake at various locations in Iowa 146 from Grinnell to Gilman, Proj. F-591(2), Marshall, Poweshiek and Tama Counties, to Magner-Johnstown Co., Sioux City, $79,737.** Flexible outlet to 48x100 ft. concrete deck girder bridge on U. S. 61 over Mosquito Ferry Creek, crossing in Sect. 29-89-47, Proj. [illegible]-86(4), Washington County, to Booth & Olson, Inc., 529 Insurance Exchange Bldg., Sioux City, $105,598. CD 3/29.

▲ Mass. Boston—Ty Institutions Dept., City Hall Annex, Apr. 12, viaduct over Boston Harbor, Mass. to Long Island, from Marginal Approach & Northern Ave. to Mass. St., $2,709,965.

▲ Cleveland—New York Central System, Apr. 5, removing existing bridge & [illegible] upon between known Sect. [illegible] on [illegible] of reinforced concrete & steel [illegible] & [illegible] Bridge No. 1 on Hellriegel Rd. over Big Creek. CD 3/24.

$432,034 superstructure [illegible] Mt. Vernon, $1,106,395.

CONTRACTS AWARDED

Georgia—State Hy. Dept., Atlanta, underpass at Seaboard Air Line R. R. and 4.0 ft. graded approaches on Atlanta-Marietta Rd., State Route 1, located approx. 1.0 mi. N. of Chattahoochee River, Fulton Co., to Cagle Bros. & Wunnicke & Wells, Inc., Jonesboro, $164,648.**** bridge approaches over Cane Creek and culvert approaches at Bloody Marsh Rd. approx. 4.5 and 8.27 mi. south of Darien, Proj. [illegible], to Demolition Contractors, Inc., Macon, $57,409.**** bridge approaches at Altamaha River in Wayne & Glynn Counties, Proj. [illegible], to Monroe Logging Co., Inc., Macon, $14,[illegible]. bridge approaches at Ogeechee River in Monroe & Jasper Counties, State Route 10, approx. 2 mi. west of west city limits of Monroe, $[illegible]. to Walton Co. to C. L. F. Hoke, Decatur, $70,998. CD 3/30. bridge and paved approaches on 136 mi. of Snap Creek and existing steel bridge at Suwannee River and paved approaches on 1.0 mi. of Lake City-Live Oak Rd., Proj. [illegible], Columbia & Suwannee Counties, to Conner Co., Inc., Valdosta, $127,427. and Contr. 2 to Conner Co., Inc., Valdosta, $460,076. Grand total $944,966. Bids to be awarded 4-11.

Idaho—State Hy. Dept., Boise, 339.2 ft. underpass and 1,149 ft. concrete viaduct overhead on 3,264 ft. approaches at Eagle Rd. over Boise River, to A. Paxton & Sons, Inc., Caldwell, $286,657. Bids 3-31, awarded 4-3. CD 3/29.

▲ New Jersey—New Jersey Turnpike Auth., West Meadow Rds., Trenton, Contr. 26, south abutment, twenty-south approach piers, 3 north approach piers, north abutment and 2 construction road embankments, one on each side of river at Hackensack River near Secaucus, Hudson Co., to Kaiser Engineers, 925 Marginal Way, Seattle, Wash., $1,629,330. Bids 3-29, awarded 4-3. CD 3/31. under LB.

Ohio—State Hy. Dept., Kaiser to Columbus, Zone 35, Type 11 and structure, span steel concrete Bridge No. GR-68-1.49, grading, paving, culverts & bridges on Rt. 68, Greene Co., to D. R. Sweeley & Sons, Inc., 424 W. Market St., Celina, $346,741. Est. $488,200.**** Type 7.32 and structures, 1 span concrete Bridge No. DA-47-60, 1 span concrete bridge No. DA-47-69, on Rt. 47, Darke Co., to Miller Bros. Construction, $57,836, est. $73,100.**** Type 7.35 and structure, 2 span steel Bridge No. BU-23-8.88, 2 span concrete Bridge No. BU-23-8.42, & 1.5, paving, grading, drainage on Rt. 23, Butler Co., to Joseph W. Vollmar, 10 Augusta Ave., Hamilton, $101,359, est. $122,400. Grand total $1,010,328. CD 3/15. Under Streets and Roads.

STREETS AND ROADS

BIDS ASKED

Wash.—Renton—B.A. $3.5—City, W. C. Hamm, city engr., improvement along Trunk Hy. 2 from [illegible] Creek, Sunset Place 7,000 ft. from state [illegible] to Rt. 2, retaining wall, paving, curb, gutter, 454 lin. ft. corru-

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stabilizing bit; road mix, one concrete deck bridge on steel I-beams and treated timber piling, one concrete box culvert of bridge length, small drainage structures 7.615 mi. State Rd. 439 between point approx. 4.5 mi. northeast of Kissimmee and State Rd. 15. Job. 9250-259. Work from Hubbard Constr. Co., Orlando, $180,840***limerock base, prime strips with bit. cons. 7.746 mi. Rd. 5 between point in Delray Beach and Lantana. Job. 9301-101, Palm Beach Co. from Rubin Constr. Co., West Palm Beach, $152,339****bit. drainage structures 7 mi., Rd. 809 between Okeechobee Rd. and Lake Park Rd. Job 9575-1114, foregoing Palm Beach Co. from W. Laell Eng. & Constr. Co., Lakeland, $348,951****bit. 2.00 ft. concrete steel bridge, small drainage structures 2.774 mi. Job. 1407-201, Fed. Aid Pri. F031-1 (2), Pasco Co. from A. E. Rich Co., Monroe and Pershing Sts., Tallahassee, $464,140****rock sand aspli. surf. 14.426 mi. Rd. 21 between Rd. 215 and Duval Co. line, state Proj. Job 7107-1151, Clay Co. from Isam Farrah Eng., 242 Nunnally Bldg., Atlanta, Ga., $108,892****limerock base with bit. 200 ft. concrete steel bridge, small drainage structures 2.774 mi. Job. 1407-201, Fed. Aid Pri. F031-1 (2), Pasco Co. from A. E. Rich Co., Monroe and Pershing Sts., Tallahassee, $464,140****rock sand aspli. surf. 14.426 mi. Rd. 21 between Rd. 215 and Duval Co. line, state Proj. Job 7107-1151, Clay Co. from Isam Farrah Eng., 242 Nunnally Bldg., Atlanta, Ga., $108,892****limerock base with bit. 200 sq. yd. Farmers Market at 31 Avenue Job 9409-103, St. route 10, from Andrews Ave. to Powerline

LOW BIDDERS

† N. M.—Albuquerque—ATTENDANTS' QUARTERS—Veterans Admin. Munitions Bldg., Wash., D. C., project same as converting Attendants' Quarters Bldg. 10 to medical wards for Veterans Admin. Hospital, Spec. 5021. CD 1/3.

Pa.—Hollidaysburg—BOILER PLANT—General State Auth., 23 and Herr Sts., Harrisburg. Apr. 12, general contract boiler plant at Hollidaysburg State Hospital; Meyer Bros., 2405 Beale Ave., Altoona, $209,600; heating, for same, from Willard Sons & Sarver, 2911 N. Broad St., Phila., $315,760*** plumbing, for same, from Lee Eng. & Constr. Co., Washington, $44,077*** heating, for same, from John Lee Eng. & Constr. Co., 2nd Ave. and Last Lane, Warren, $85,600. CD 3/21.

Wis.—Racine—HOUSING—Racine Co., Apr. 6, general contract 2 story 45x270 ft. concrete steel frame, from Nevell & Co., Inc., 1650 Yant St., $397,000. CD 3/15.

CONTRACTS AWARDED

▲ Mich., Detroit—HOUSING—Detroit Housing Auth., 409 Griswold St., 3/4 unit masonry, concrete, terra cotta and boiler house addn., Jefferson Homes Proj., 1400 Penobscot Bldg., $1,478,000. Bids 3/20. Awarded 4/11. CD 3/24, under LB.

Neb., Wayne—DORMITORY—State Normal Bd., Capitol Bldg., Lincoln, general contract dormitory at Wayne Teachers College, to Wilson Constr. Co., Rm. 2, 51 Lincoln, $333,321. Bids 4/1. CD 1/2.

N. C., Charlotte—HIGH SCHOOL—Mecklenburg Co. Bd. Educ., W. B. Metcalf, chr., Courthouse, Avery High School, to Little & Little, Box 1055, 1120 E. Worthington St., $448,888. Bids 3/21. CD 4/4.

O., Hamilton—SCHOOL—Bd. Educ., Hamilton, 29 room Harrison Monroe School, to James L. Barnes Constr. Co., 6 Beuttler Ave., Springfield, $559,000. Bids 3/30, awarded 4/6. CD 3/8.

Wash., Renton—SCHOOL—School Dist. 403, Renton, general contract 1 story, 99x183 ft. reinforced concrete, 23x52 ft. high auditorium addn. to Garfield Glacier Co., Box 1, Spokane, $411,000. Bids 4/6. CD 3/22.

N. S., Greenwood—HOUSING—General Montague & Housing Corp., 1042 Dominion St., Halifax, N. S., housing development, 150 houses, to Terminal Constr. Co., Ltd., same address, low bidder, Montreal, Que. Approx. $675,000. Bids 3/31. CD 3/10.

P. E. I., Summerside—SCHOOL—General Montague & Housing Corp., 1042 Dominion St., Halifax, N. S., 100 Pupil unit, to D. Nowlan Constr. Co., Ltd., Bedford Station, Eastern Woodworkers Ltd., Brother St., New Glasgow, N. S. Approx. $704,000. Bids 4/4. CD 3/10.

COMMERCIAL BUILDINGS

BIDS ASKED

▲ Calif., Los Angeles—HOTEL—B. A. 4-15, Hotel Tower, 7 Ave. and 55 ft. New York, N. Y., 13 story Los Angeles Hotel Statler and office bldg., 900 to 960 Wilshire Blvd., $10,000,000. Architect Rice & Morgan, 333 N. Michigan Ave., Chgo., 11. Owner, Edward B. Barnes, Robert E. Hannegan, Mike L. Fleming, 804 W. 6 Street, Los Angeles. CD 3/17.

SOON LETS CONTRACT

Colo., Denver—OFFICE—Mutual American Life Insurance Co., Colorado National Bank Bldg., soon lets general contract 8 story, basement, 32x100 ft. addn. to Equitable Bldg., $100,000. Raymond M. Ervin, 630 Equitable Bldg., archt. and engr.

CONTRACTS AWARDED

Calif., Sacramento—APARTMENTS—Lew Skirkey, 2458 El Dorado Lane, to Seneres & Santa Anita Tract, Owner Builds, $522,000.

▲ Mo., St. Louis—STORE—May Dpt. Store Co., M. J. Shay, general contractor, Famous Bar Dept. Store, Railway Exchange Bldg., Art Oliver St., Zone 1, 3 story, basement & mezzanine, 80x260 x 320 ft. brick steel structure, conc. dept. steel, incl. parking facilities on nearby lots, 2,500 car capacity, air conditioning, Kingshighway Blvd. and Delmar Blvd., to Wallace Kingshighway Blvd. and Delmar Blvd., to Wallace & Holland, Railway Exchange Bldg., 611 Olive St., Zone 1, $2,500,000. CD 1/16.

Mo., St. Louis—HOUSING—Jack E. Thomas Thomas Investment Co., 2329 Sanford Ave., Zone 20, construct five 6 to 18 family 2 story, Williamsburg Colonial style houses along Sanford Ave. between Oakland and Clayton Aves., to Eastgate Realty Co., 2329 Sanford Ave., Zone 20, Approx. $350,000. CD 3/24.

Mo., Webster Groves (St. Louis P.O.)—HOUSING—Burton W. Chenke Inc., 1 Lockwood Ave., Webster Groves, and scientific Sts., to construct 6 brick veneer houses with connected garages, Webster Dist. Division on Gravois Rd. south of Big Bend Rd., Approx. $500,000.

O., Dayton—RESIDENCE—Willingdale Realty Co., Sidney Ellinberger, pres., 124 Forest Ave., Dayton, 19 business men in Wilmington, to construct 1 story, basement, 80 ft. frontage, 2 apartments, main floor and offices on 2nd floor, 1200 ft. frontage on Henry Stein & Co., Leasing Agt., to N. Ludlow St., Approx. $300,000. Lauer & Neff, for 30 days.

Pa., Phila.—OFFICE—1500 Chestnut Bldg. Inc., 1500 Chestnut St., 12 story bldg., residential basement, Bureau and Co., to Glover Arnold & Co., 1500 Chestnut St., $250,000.

Pa., Phila.—RESIDENCE—Maxwell Jay, Inc., 6317 N. 6 St., residential development, Jane St., 7230 Frankford Ave., $250,000.

▲ Pa., Pittsburgh—OFFICE—Equitable Life Assurance Society, 393 Seventh Ave., New York 1, N. Y., three 20 story office bldgs. on 23 acre site at junction of Allegheny and Monongahela Rivers, to Starrett Bros. & Eken, 51 Wall St., New York 5, N. Y., $50,000,000. CD 9/21.

Tex., Houston—DWELLINGS—W. C. Perkins, 701 Gulf Bank Bldg., 30 dwellings, Owner builds, Approx. $266,000. CD 4/10.

Tex., Monahans—RESIDENCES—W. D. Bellamy, Box 84, Monahans, 60 residences, Owner builds, Approx. $550,000. CD 4/7.

Wis., Milwaukee—CLUBHOUSE—Milwaukee Boys' Club, 1121 N. Vel Phillips St., Zone 3, 2 and 4 story part burnt, 144x244 ft. clubhouse, to Geiger-Ernst Co., 622 W. State St., Milwaukee, Zone 14. Approx. $650,000. Bids 4/5. CD 2/24.

INDUSTRIAL BUILDINGS

SOON LETS CONTRACT

Ore., Portland—WAREHOUSE—Ralph E. Bennett & Co., 1 story, 100x200 ft. steel frame warehouse, Alex Sheppard, Jr., Box N, Shaver St., engr.

CONTRACTS AWARDED

Fla., Jacksonville—WAREHOUSE—E. F. Sutton on Normours & Co., du Pont Bldg., Wilmington, Del., concrete warehouse, Dennis St. and A.C.L. R.R., for du Pont Paint Co., to Gaines & Eaton, 218 W. Church St., Zone 1. Approx. $75,000. Awarded Beach Eng. & Constr. Co., contractor, engr.

Mass., New Bedford—GARAGE—Louis Hanson, Ashley Pleasant St., 1 story, 50x100 ft. reinforced concrete stone garage, post garage, Mingo, County and Elm Sts., to Sullivan Foster, Inc., 1 Purchase St., $80,000. U. S. P. O. Dpt., Irving Closson, Supervising & Rumsville, 222 Union St., engr.

Mass., Springfield—FACTORY—Standard Electric Time Co., 89 Logan St., 1 story, 110x110 ft. brick steel factory addn., Logan St. and Adams & Rankin Constr. Co., 2367 Main St. Approx. $80,000. Bids 3/25. CD 3/21.

Mo., Lees Summit—PLANT—R. B. Rice Package Co., Lees Summit, 28x60 ft. and 82x105 ft. fabricating, cork insulation, sausage mfg. plant addn., Wendorff Eng. Co., 1 Emery Bldg., Kansas City, Mo., archt.

N. Y., Corning—EQUIP. PLANT—Corning Glass Works, Walnut St., to erect equipment, 2 story, steel & brick, Ferguson Co., 54 Rector St., New York. Approx. $500,000. Work underway. CD 1/26/47.

Pa., Dublin—FACTORY—H. B. Durell & Son, Inc., Dublin, brick factory addn. to A. Lester Nunn, 20 West Queen Downtown, $68,000. Fred Martin, Doylestown, archt.

R. I., Pawtucket—FACTORY—Royal Electric Co., Inc., 90 Grand Ave., 1 story, 60x140 ft. brick steel factory addn., Grand Ave. to Century Line & Division Sts., 210 Main St., Providence. Approx. $75,000. Sumner Sollech, 111 Washington St., Providence, archt.-engr.

Tex., Gilmer—AUTO SERVICE—Pounds Buick Co., Inc., new auto service, parts, sales, Owner builds, Approx. $70,000. Adams & Adams, 518 W. Overton St., archts.

Tex., Itasca—OFFICE & WAREHOUSE—Itasca Cotton Mfg. Co., office, warehouse, cotton ginning machinery addn., to Fowler. Approx. $120,000. CD 3/13.

Alaska, Fairbanks—PLANT—Alaska Juneau Gold Mining Co., Fairbanks, automotive and repair plant, for labor, $250,000.

Que., Montreal—WAREHOUSE—Lawrence Chemical Co., 1 story, 100x200 ft. warehouse, Lawrence Chemical Co., 444 W. Cherbrooke St., archts.

UNCLASSIFIED

LOW BIDDERS

Ill., Effingham—SWIMMING POOL—Effingham Park Dist., Effingham, Apr. 10, 60x82 ft. swimming pool, Mautz & Greer, Effingham, $84,825. CD 3/20.

▲ N. Y., St. George—TERMINAL—Borough of Manhattan, Pier A, North River, New York, to Admiral Oil, wharf and main terminal facilities, incl. constructing terminal and appurtenances, to Terminal Constr. Corp., 2638 Pine Ave., New York, 7 & Kinsler Inc., 240 Pine Ave., New York, 7, $1,000,190.

+ North Dakota—TEXAS passed: Bismarck, Reclamation Dpt., Interior, Bismarck, 219 m. of 115 kv transmission line, Garrison Dam to Minot, 2 substations, Bismarck and Minot, 1 switching station, Garrison Dam, Spec. 2435, Bids 4/5. CD 2/23.

▲ North Dakota—TRANSMISSION LINES—Bureau of Reclamation, Dpt. Interior, Bismarck, 219 m. of 115 kv transmission line, Garrison Dam to Minot, 2 substations, Bismarck and Minot, 1 switching station, Garrison Dam, Spec. 2435, Bids 4/5. CD 2/23.

CONTRACTS AWARDED

▲ Nev., Las Vegas—RACE TRACK—Las Vegas Thoroughbred Racing Assoc., Joseph Smoot, pres., 900 S. 5 St., race track and facilities, grandstand and clubhouse, to Mike Lee Constr., 5863 Avalon Blvd., Los Angeles, Mike Lee, contr. Approx. $1,000,000. CD 1/23.

N. Y., New York—ELECTRICAL INSTALLATION, Port of New York Auth., 111 8 Ave., Zone 11, electrical installation in West 179 St. tunnel and ventilating bldg., to Plymouth Electric Co., 21 E. 40 St., $138,750. Bids 4/3. CD 3/9.

Va., Blacksburg—UNDERGROUND STEAM TUNNEL—Virginia Polytechnic Institute, Blacksburg, underground steam pipe tunnel and mains from Burruss Hall, Harry Husbandry Bldg., installing pipe to, A. L. Wright Jr. & Co., 2510 High St., Portsmouth, $32,301; tunnel constr., to James J. Pantapan, Narrows, $76,301. Bids 4/24. CD 3/15.

PROPOSED PROJECTS

WATER SUPPLY

Kan., Olathe—City Comm. has voted $265,000 bond issue for water purification plant. Poole & Poole, engrs. City Hall, engrs. CD 3/6.

Mass., Natick—Town Water Dept., 24 Summer St., to lay 24 in. cement water main, $105,000. Whitman & Howard, 89 Broad St., Boston, consult engrs.

Tex., Kingsville—City plans $150,000 water and sewage bond issue. $75,000 for water system improvements. $150,000. CD 3/6.

Tex., Odessa—City, WW, $135,000. Kenneth J. Postlethwaite, consult engr. E. O. Martin, City Sec., engr. CD clear.

Tex., Santa Anna—City votes bonds, $140,000 for water system improvements. $140,000 for sewage system. $35,000. Freese & Nichols, Wilkins Bldg., Fort Worth, consult engrs.

Wash., Linden—City, city hall, water plant, $100,000. Wm. Livingston & Associates, 1411 4 Ave., Seattle, consult engrs. Ed. Miller, engr. CD 2/21.

▲ W. Va., Fairmont—City, City Bldg., water plant, $1,300,000. Consulting engr. E. Keyser, engr. CD & consult as to cost, Keyser, engr. CD 3/6.

W. Va., Monongah—City plans to issue $140,000 bonds for Holland Ave. water & sewer improvements. $140,000.

Alaska, Wrangell—City, city hall, water, $125,000. A. J. Anderson, consult engr. CD 11-14-49.

Ont., Hamilton—City, J. E. Barry, city engineer, plans $104,400 water and sewage improvements, incl. Dundurn Park and High Level Park. Approx. $104,400. W. Hamilton, engr. CD 3/30-49.

SEWERS, WASTE DISPOSAL

Calif., Los Angeles—Bd. Supvrs., Los Angeles Co., 501 Hall of Records, sanitary sewers in Mount Curve Ave., $300,000. C. E. Arnold, engr.

Kan., Ottawa—City, Apache & Cherokee Sts., sewage plant, engrs. CD 3/6.

Minn., St. Peter—City, Apache & Cherokee Sts., sewage treatment plant, intercepter sewers, $125,000. Tiry & Braun, 24 Pioneer Bldg., St. Paul, engrs.

Miss., Jackson—City, City Hall, sanitary sewer extensions, Lynch Creek area, $350,000. Mallett & Mallett, engrs. F. Amite, city engr., sanitary sewer extensions, Pearl River area, $300,000. Avondale sewer extensions, Lynch Creek area, $150,000. W. E. Simmons, Bingo Federal Bldg., engr.

N. M., Santa Fe—City, sewage treatment plant addn., $175,000; sewer extensions, $300,000; incinerator, $125,000. Heckendorn & Turney, 223 Wallace Bldg., Albuquerque, engrs.

N. C., Williamston—Town, sewage system, $500,000. Hobbs & Scarborough, Inc., 1 Hillsboro St., Raleigh, engrs.

O., Rockford—Village, sewage disposal system, $250,000. Bureau of Water Supply, Columbus, consult engr.

Okla., Ada—City, voted bonds, sewage disposal plant, $375,000; sanitary sewer main extns., $645,000. Jno. Delaney, Ada, consult engr. CD 1/27.

Tex., Bellaire—City, sewage system, $375,000. Paul Price, engr. CD 3/6.

Tex., Houston—City, Water & Sewer Dept., 410 Bagby St., sewage system, $200,000. Harris County Flood Control Dist., Courthouse, sewage system, $225,000. Cedar Bayou Navigation & Levee Dist., Courthouse, sewage system, $75,000. Pinkard Construction Co., 1200 Main St., engrs. CD 12/23.

Tex., Houston—City, Water & Sewer Dept., 410 Bagby St., sewage system, $50,000. Harris County Flood Control Dist., Courthouse, sewage system, $50,000. Chapman Eng. Co., 5614 Dyer St., engrs.

Tex., Houston—C. F. King, 4110 Dennis St., sanitary sewers, $75,000; storm sewers and drainage, $65,000, in Houston sanitary district portion of Sect. 2, of South

Park and Jeff Holmes Rd. between Griggs Rd. and Chocolate Bayou.

Tex., Kilgore—City voted bonds, sanitary sewer mains, $250,000; sewage disposal plant, $350,000. A. P. Norris, 200 N. Martin St., Kilgore, engr.

Tex., Kingsville—City voted bonds, sewer outfall line, $290,000; sewer lift station, disposal ponds and $175,000. OD 3/24.

Wash., Brewster—Town, Town Hall, treatment plant and 30,000 ft. of line, $100,000. [illegible]

Alaska, Fairbanks—City, City Hall, 13,965 ft. sewers, pump plant and lift station, General Services Admin., Phil. 50 A-137, $109,150. [illegible]

Ont., Aylmer—City, District, Tile Burgundy, sewage disposal sys., $100,000-$150,000. [illegible]

BRIDGES

▲ Md., Baltimore—City, Bureau Hgs., 301 Municipal Bldg., Zone 2, bridge to carry Hanover Pkwy. over B. & O. R.R. tracks at Stockholm St., $2,500,000. Sundell, Weiner & Arden, 2121 N. Calvert St., consult. engrs. JCS, H. Mickey, hy. engr.

Massachusetts—Commonwealth of Mass., Dept. P. Ways, Boston.

Townsend, Lawrence and North Andover—3 bridges, $150,000. [illegible]

Ontario, Province of, Ontario, Toronto.
Windsor—bridge reconstruction, hy. sec., $100,000. [illegible]

STREETS AND ROADS

Del., Wilmington—City, Division Street & Sewers, City Hall, Municipal Bldg., 1st fl., 4th and Market sts., from front to curb, $130,000. Edwin T. Kreitler, City Hall, 1st and King sts., engr.

Indiana—State Hy. Comm., Indianapolis.
Marion Co.—conc. slab repairing 2.5 mi. Southeastern Ave. to Post Rd., $[illegible]. Ave. to [illegible] mile south, repaving 1.41 mi. Massachusetts Ave., D. S. Bell Co., [illegible]. [illegible]

[illegible] Ave., [illegible] Ave. to [illegible] Ave., [illegible] Ave. to [illegible] Ave., [illegible] Ave. to [

Ont., Weston (Toronto) SCHOOL—Rd. Educ. Bd., Weston, collegiate and vocational school add. Approx. $420,000.

COMMERCIAL BUILDINGS

Calif., Beverly Hills, MEDICAL—Beverly Hills Clinic, c/o Wm. L. Pereira, 7421 Beverly Blvd., Los Angeles, 4 story, 60,000 sq. ft. medical bldg., $700,000.

▲ Conn., New Haven, [illegible] Co., [illegible] Whitney Ave., New Haven, 10 story, brick and steel [illegible] Ave., 2 story, brick and steel [illegible] chimney, Ave., $2,000,000. CD 12-31-51.

Kan., Ottawa, HOSPITAL—Ottawa Memorial Hospital, Ottawa, plans by C. W. Boettcher Architects, Kansas City, Kan., hospital addition, $400,000.

Ky., Louisville, SCHOOL—Board of Education, Jefferson County, 3rd and Madison Sts., Louisville, 2 story, brick and concrete, [illegible] Ky., home ec. bldg., [illegible] Ky., 2 story, brick and concrete, [illegible] Ky., 2 story, brick and concrete, [illegible] Ky., 2 story, brick and concrete,

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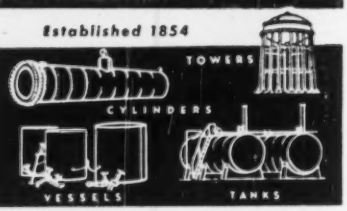

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INDUSTRIAL BUILDINGS

Colo., Pueblo—FOUNDRY—Triplex Corp. of America, Pueblo, foundry, $300,000.

Ky., Louisville—SHOP—Louisville & Nashville R.R. Co., C. H. Blackman, cn. engr., 908 St. and Broadway, Cairo, Ill.; C. Hulley, C/O owner, diesel shop addn., $400,000.

La., Baton Rouge—PLANT—Capitol Industries, Inc., c/o Roy E. Wallace, 2560 Stanford Ave., meat packing plant, $300,000.

N. J., Trenton—GARAGE—Charles N. Schroeder, Inc., 220 E. Hanover St., plans by owner, S. Kaplan, 25 N. Montgomery St., garage, $350,000.

Tex., San Antonio—MOTOR SALES and STORAGE—Quad Motor Co., 313 Lexington St., addns., masonry motor sales and storage, $300,000.

▲ Tex., Texas City—PLANT—Monsanto Chemical Co., & American Viscose Co., Texas City, nylon tire fabric mfg. plant; fabric to be known as "chemstrand", Approx. $35,000,000.

Wis., Sturgeon Bay—RECEIVING STATION—Lake to Lake Dairy Cooperative, 917 S. 8 St., Manitowoc, plans by Foeller, Schober, Verners, Schmid & Jahn, 210 Pine St., Green Bay, dairy receiving station, $550,000.

▲ B. C., Vancouver—PLANT—Howater Corp., Corner Brook, Newfoundland, pulp and paper plant, Approx. $2,500,000.

▲ Ont., New Toronto—PLANT—British Oxygen Canada Ltd., c/o British Oxygen Co. Ltd. London, England, plant construction, $1,000,000 with equip.

▲ Ont., Oshawa—WAREHOUSE—General Motors of Canada, Ltd., Oshawa, central parts warehouse, $3,000,000. CD 10-19.

Que., Three Rivers—PLANT—Canadian Westinghouse Co., 220 Sanford Ave. N., Hamilton, mfg. plant, in west end of city, Approx. $400,000.

UNCLASSIFIED

▲ Ala., Mobile—BERTHS—Dept. State Docks & Terminal Mobile Berths 1, 2, 3, Proj. 1-P-1005, $2,565,000. R. R. Doyle & Co., P. O. Box 2094, consult. engrs., CD 11-8-49.

Calif., Long Beach—WHARF, etc.—Proctor & Schwartz Mfg. Co., 1401 W. 7 St., raise wharf and build rock dike, $100,000. J. H. Davies, 730 [illegible] St., consult. engrs.

Illinois—RURAL DISTRIBUTION LINES—Clinton County Electric Co-operative, J. H. Heimann, mgr., Breese, addn. rural distr. lines in Clinton Co., and sys. improv., $177,000.

Indiana—RURAL DISTRIBUTION LINES—[illegible] Co. Rural Electric Membership Corp., Jeffersonville, [illegible] rural distr. lines, sys. improv., Clark [illegible], $350,000. CD 12-1-47.

Ind., Ft. Wayne—DRIVE-IN THEATRE—Walter J. Erle, Sturgis, 700 car capacity drive-in theater, east of Ft. Wayne on 10 acre tract near junction of U. S. Rds. 30 and 24, $125,000.

Minnesota—RURAL DISTRIBUTION LINES—Carlton Co. Co-operative Power Assoc., Kettle River, [illegible] mi. rural distr. lines, 28 mi. 69 kv. transmission lines, sys. improv., Carlton Co., $715,000.

Minnesota—RURAL DISTRIBUTION LINES—Minnesota Power Co-operative, Grand Forks, N. [illegible] 69 kv. transmission line, Hull [illegible] 4 kv. A.C.S.R. conductor Class 2 poles, Bagley-Bemidji, [illegible] 1/0 A.C.S.R. conductor Class 10 poles, Itasca County, [illegible], Approx. $100,000. A. L. Coburn, [illegible] owner engr.

Miss., New Albany—NATURAL GAS LINES, etc.—City, City Hall, bond election May 8, natural gas and transmission lines, $710,000. Forter, Barry & Switzer, 545 Lafayette St., Baton Rouge, consult. engrs.

Montana—RURAL DISTRIBUTION LINES—[illegible] Electric Co-operative Assoc., Pinson, [illegible] rural distr. lines, 116.6 mi. 34.5 kv. transmission line, Elmo Co., $110,000. CD 5/29.

South Carolina—RURAL DISTRIBUTION LINES—Laurens Electric Co-operative, Laurens, 98 mi. distr. lines and sys. improv., Laurens Co., $225,000.

South Dakota—RURAL DISTRIBUTION LINES—[illegible] Region Electric Assn., Webster, rural distr. lines, Day Co., $700,000. Banister Eng. Co., [illegible] University Ave., St. Paul, Minn., consult. engrs., CD 7/26/49.

▲ Texas—PIPE LINES—Tennessee Gas Transmission Co., Commerce Bldg., Houston, natural gas pipe lines, 18 mi., Alice area, Jim Wells Co., $275,000; 15 mi., near Refugio area, Refugio Co., $290,000; 15 mi., near Rockdale, Burleson Co., $240,000; 12 mi., Victoria area, Victoria Co., $190,000; 17 mi., Wharton, Wharton Co., $260,000; natural gas compressor units, Kleberg, Jasper Co., $325,000; Cleveland, $150,000; East Bernard, $175,000; Aqua Dulce, $250,000.

Tex., Alvin—GAS PLANT—City, A. Richardson, mayor, voted bonds, natural gas plant and distribution, $300,000. Fred Martin, 7140 Dixie Dr., consult. engr., CD 3-10.

Va., Martinsville—ELECTRICAL DISTRIBUTION—City, [illegible] distribution extensions, $100,000.

Wash., Aberdeen—ATHLETIC CENTER—St. Mary's Parish, Aberdeen, athletic center, $150,000.

▲ Ont., Mimico—RAILYARD EXPANSION—Canadian National Rys., 105 Main St., Montreal, 2½ mile railyard expansion, 20 tracks, moving Mimico station to new site, $2,600,000. CD 11-21-49.

CONSTRUCTION REPORTS–Second Section

WATER SUPPLY

BIDS ASKED

Minn. Pierz. B.A. & S.I. Village Eng. Pleiningerberger-Lee Assoc. Arch., St. Cloud. Water system, including elevated steel tank, water mains, hydrants, gate valves and appurtenances. Bids 4 p.m. Apr. 27. Village Hall. Deposit $10. Hattenberg, Townsend & Sinclair, 1437 Marquette Ave., Minneapolis.

N. Y. Rochester. B.A. & S.I. Arthur Ford, W. Exeter and City Hall, Dansville. Water system, including 24 in. to 12 in. C.I. water mains, 2 elevated steel tanks, 1 pumping station with booster pumps, appurtenances for distribution system from Lake Ontario. Engineer's estimate $2,000,000. Bids 11 a.m. May 1. Village Hall, Dansville. Deposit $100. Clinton R. Woodruff, Consulting Engr., 1 Gibbs St., Rochester.

† R.I. Newport. B.A. & S.I. Comdr. Public Works Office, Naval Base, water treatment plant, 5 mg. reservoir, water softener for Naval Hospital, N.Y. Telephone 2-2600. Engineer's estimate $250,000. Extended date.

Miss. Waynesboro. B.A. & S.I. Town Hall. W.W. Talbert, Jackson, Miss., engr. CC 2-27.

† Tex. Roma. B.A. & S.I. U. S. Dept. Agr., Farmers Home Adm., Water Conservation Br., Temple. Water system, including 6 in. water mains, hydrants, gate valves, elevated steel tank, pumping station, chlorinator, meters, etc. Bids 2 p.m. May 4. Village Hall. Deposit $10. Plans on file at office of Starr County Farmers Home Adm. Supervisor, Rio Grande City. Approx. $30,000 contract; project cost, including fees, $50,000. Contracts awarded separately. Start Sept. Approx. 60 days. Lockwood, Andrews & Newnam, Inc., Eng., 1500 Main St., Houston.

LOW BIDDERS

Conn. Middletown. City Bd. Water Comrs. Apr. 12. 12 in. cast-spun concrete lined pipe, 1,000 ft. 211 E. 43 St., New York, N.Y. $74,000. Valve from Hammond Iron Works, Pa. $44,355. price $3,165 for hydrant piping. CE 4-20.

Md. Towson. Baltimore Co. Treasurer. Apr. 10. (1) approx. 2,250 ft. 24 in. to 12 in. C.I. water mains, 30 in. steel pipe for storm drain. (2) 20,200 ft. 12 in. to 6 in. C.I. water mains, 2 elevated steel tanks, 1 pumping station with booster pumps, 4 in. copper tubing, 142 mete. vaults, valves and covers to the hydrants and meters. Engineer's estimate (1) $179,700; (2) $1,346,656. Rock River Neck, Wetland Garden Apts., Baltimore. $179,700. Rock River Neck, Marcos Ave., Baltimore. $1,346,656. Alexander A. Abramson & M. Robert Abramson, Eng., 224 Altamont St., Baltimore. $45,000. CD 3-24.

N. Y. Westfield. B.A. Village Trustees, Municipal Bldg., 33 Elm St. Apr. 4. water treatment plant, 2 mg. reservoir, 4 mg. standpipe, 16 in. to 6 in. C.I. water mains, 2 booster pumping stations, 1 chlorinator, 1 fluoridator, 1 hydrant, watermains, etc. Walt Wilkinson, Inc., Eng., 1 Main St., Buffalo. $333,579. CE 2-16.

Pa. Phila. Dept. P. Ways. Apr. 11. Water mains in House Ave. etc. Walt Wilkinson, Inc., Eng., 1 Main St., Buffalo. $108,672 and $113,652. Superintendent, Filbert J. Taylor, Water Bureau, Municipal Bldg., Market St. $242,197.

Pa. West Chester. West Chester Municipal Authority. Apr. 27. water treatment plant, 2 mg. reservoir, 1 pumping station, 16 in. to 6 in. C.I. water mains, etc. Walt Wilkinson, Inc., Eng., 1 Main St., Buffalo. $310,510. Tex. Dallas. City Pur. Apr. 11. 24 in. to 12 in. C.I. water mains in Hillcrest Addn., Block 1/5512, Kings Row. $313,000. Engineer's estimate $310,000. Contract 1 from Jensen Center to Forest Ave. $83,980. Contract 2 from Forest Ave. to Kings Row. $310,000. CD 3-10 and CD 3-11.

—CONTRACTS AWARDED

Ga. Brunswick. Glynn Co. Bd. Comrs. Water system, including 6 in. water mains, hydrants, gate valves, elevated steel tank, pumping station, chlorinator, meters, etc. Bids 2 p.m. Apr. 3. Glynn Co. Courthouse. Deposit $25. Plans on file at office of Glynn Co. Supervisor, Brunswick. Approx. $200,000 contract; project cost, including fees, $250,000. Contracts awarded separately. Start May. Approx. 60 days. Lockwood, Andrews & Newnam, Inc., Eng., 1500 Main St., Houston. $223,403.

Tex. Dallas. City Pur. Apr. 11. 24 in. to 12 in. C.I. water mains in Hillcrest Addn., Block 1/5512, Kings Row. $313,000. Engineer's estimate $310,000. Contract 1 from Jensen Center to Forest Ave. $83,980. Contract 2 from Forest Ave. to Kings Row. $310,000. CD 3-10 and CD 3-11.

SEWERS, WASTE DISPOSAL

BIDS ASKED

Ont. Sudbury. B.A. R.O.G. M. Peterson, 11 Elm St. Water and sewage treatment plants, etc. Walter E. Wilkinson, Eng., 1 Main St., Buffalo.

Miss. Waynesboro. B.A. & S.I. Town Hall. W.W. Talbert, Jackson, Miss., engr. CC 2-27.

Tex. Stamford. B.A. & S.I. City Hall. Water system, including 6 in. water mains, hydrants, gate valves, elevated steel tank, pumping station, chlorinator, meters, etc. Bids 2 p.m. May 4. Village Hall. Deposit $10. Plans on file at office of Starr County Farmers Home Adm. Supervisor, Rio Grande City. Approx. $30,000 contract; project cost, including fees, $50,000. Contracts awarded separately. Start Sept. Approx. 60 days. Lockwood, Andrews & Newnam, Inc., Eng., 1500 Main St., Houston.

Calif. Los Angeles. B.A. & S.I. Bd. Pub. Wks., Room 350, City Hall. Apr. 12. 8 in. to 6 in. V.C.P. sewers and appurtenances in Sunset Blvd. Engineer's estimate $160,832. Bureau of Engineering, 1149 S. Broadway, Los Angeles. $524,484.

Calif. San Diego. Lemon Grove Sanitation Dist. Apr. 28. Sewers and appurtenances in Lemon Grove Sanitation Dist. No. 1. Engineer's estimate $160,832. Bureau of Engineering, 1149 S. Broadway, Los Angeles. $524,484.

Calif. San Jose. City Pur. Apr. 28. sanitary sewers in Willow Glen Area. Bureau of Engineering, 1149 S. Broadway, Los Angeles. $373,140. CD 3-28.

Ky. Albany. City Pur. Apr. 10. (1) sanitary sewers, treatment plant, pumping station, force main, etc. (2) sanitary sewers, force main, etc. Engineer's estimate (1) $184,366. (2) $59,423. Bureau of Engineering, 1149 S. Broadway, Los Angeles. $373,140. CD 3-28.

▲ N. Y. Port Jervis. City Water Dept. 120 Wall St., New York. Apr. 25. (1) intersecting sewers, force mains, pump stations, sewage treatment plant for Port Jervis. (2) sewage treatment plant for Deerpark. Engineer's estimate (1) $533,750. (2) $1,346,656. Walter E. Wilkinson, Inc., Eng., 1 Main St., Buffalo. $533,750. North Attleboro, Mass. CD 3-31.

Tex. Fort Worth. City Pur. Apr. 11. 8 in. to 6 in. V.C.P. sewers in Between Streets Addn., Block 1/5512, Kings Row. $313,000. Engineer's estimate $310,000. Contract 1 from Jensen Center to Forest Ave. $83,980. Contract 2 from Forest Ave. to Kings Row. $310,000. CD 3-10 and CD 3-11.

Wash. Auburn. City Pur. Apr. 11. 8 in. to 6 in. V.C.P. sewers in Between Streets Addn., Block 1/5512, Kings Row. $313,000. Engineer's estimate $310,000. Contract 1 from Jensen Center to Forest Ave. $83,980. Contract 2 from Forest Ave. to Kings Row. $310,000. CD 3-10 and CD 3-11.

—CONTRACTS AWARDED

Conn. Waterbury. City P. Wks. Dept. City Hall. 8 in. to 6 in. V.C.P. sewers in Between Streets Addn., Block 1/5512, Kings Row. $313,000. Engineer's estimate $310,000. Contract 1 from Jensen Center to Forest Ave. $83,980. Contract 2 from Forest Ave. to Kings Row. $310,000. CD 3-10 and CD 3-11.

Tex. San Antonio. W. & Sewer Dept. Apr. 4. $60,000. sanitary sewers, approx. $55,000. Bids 2 p.m. Apr. 4. 10.

BRIDGES

BIDS ASKED

STATE HIGHWAY LETTINGS

May 2
Maryland
Wisconsin

May 9
Maryland
Wisconsin

May 10
California

LOW BIDDERS

Michigan. Wayne Co. Bd. Comrs. Apr. 12. Bridge over Rouge River, Dearborn. Engineer's estimate $87,812. Wayne Co. Bldg., Detroit. $87,812.

Mich. Wayne Co. Bd. Comrs. Apr. 12. Bridge over Rouge River, Dearborn. Engineer's estimate $218,238. Wayne Co. Bldg., Detroit. $218,238.

▲ New Jersey. State Highway Engineer. Apr. Work in Hudson, Bergen, Passaic, Essex, Union, Middlesex, Monmouth, Ocean, Burlington, Camden, Gloucester, Salem, Cumberland, Atlantic, Cape May, Mercer, Somerset, Hunterdon, Warren and Sussex Counties. Engineer's estimate $1,365,108. Bureau of Engineering, 1149 S. Broadway, Los Angeles. $1,365,108.

$648,170.

N. Y. † Bridgeton. Bridge over Rouge River, Dearborn. Engineer's estimate $175,560. Wayne Co. Bldg., Detroit. $175,560.

Pennsylvania. Bridge over Rouge River, Dearborn. Engineer's estimate $230,084. Wayne Co. Bldg., Detroit. $230,084.

Tennessee. Bridge over Rouge River, Dearborn. Engineer's estimate $291,967. Wayne Co. Bldg., Detroit. $291,967.

$67,349.

—CONTRACTS AWARDED

Arizona. Bridge over Rouge River, Dearborn. Engineer's estimate $292,762. Bids 4 p.m. awarded 4-5.

New York. Bureau Contracts & Accounts, Bertram D. Tallamy, Supt. Asbury, reinforced deck and pavement on I. Rt. Mosier Ave. Brookside. Queens Contracting Corp., 827 Kennedy Ave., Brooklyn. $931,040. Bids

Ontario. Dept. Hwys. Timmins. Ont. St. concrete bridge over Nation River, Chesterville, to John Chisholm Associates, Approx. $100,000. Bids 3 p.

STREETS AND ROADS

BIDS ASKED

STATE HIGHWAY LETTINGS

May 2
Maryland
Wisconsin

May 5
Minnesota

May 9
Wisconsin

May 10
California
New York

May 11
California

May 12
Pennsylvania

Calif. Long Beach. B.A. & S.I. Bd. Pub. Service, City Hall. Apr. 12. 34 in. to 24 in. W. Boulevard Ave. Engineer's estimate $146,142. Public Service Bldg. Deposit $10. Jones & Emmons, Eng., 1 Wilshire Bldg., Los Angeles.

Calif. Long Beach. B.A. & S.I. Bd. Pub. Service, City Hall. Apr. 12. 34 in. to 24 in. W. Boulevard Ave. Engineer's estimate $146,142. Public Service Bldg. Deposit $10. Jones & Emmons, Eng., 1 Wilshire Bldg., Los Angeles.

Tex. Houston. Bids Asked. Paving, drainage and appurtenances in Sharpstown Addn. Section 2. Engineer's estimate $2,000,000. Harris Co. Courthouse. Deposit $100. Plans on file at office of A. Charles Stern, Eng., 2727 Allen Parkway, Houston. Project cost, including fees, $2,500,000. Contracts awarded separately. Start May. Approx. 60 days. Lockwood, Andrews & Newnam, Inc., Eng., 1500 Main St., Houston.

Tex. Houston. Bids Asked. Paving, drainage and appurtenances in Sharpstown Addn. Section 2. Engineer's estimate $2,000,000. Harris Co. Courthouse. Deposit $100. Plans on file at office of A. Charles Stern, Eng., 2727 Allen Parkway, Houston. Project cost, including fees, $2,500,000. Contracts awarded separately. Start May. Approx. 60 days. Lockwood, Andrews & Newnam, Inc., Eng., 1500 Main St., Houston.

LOW BIDDERS

Arizona. State Hy. Dept. Phoenix. reinforcing, 4 mi. Phoenix-Mesa Hwy. Ariz. Highway Dept., 115 Power Ave., Mesa. $319,690.

† California. State Hy. Dept. Sacramento. Apr. 12. New Mokelumne River Bridge on U.S. 99 at Thornton. Engineer's estimate $150,418. Bridge Dept., 1120 N. St., Sacramento.

California. State Hy. Dept. Sacramento. Apr. 12. 0.2 mi. grading, drainage, bridge, etc. on Rt. 5 in Los Angeles Co. Engineer's estimate $57,166. Bridge Dept., 1120 N. St., Sacramento.

California. State Hy. Dept. Sacramento. Apr. 12. 0.2 mi. grading, drainage, bridge, etc. on Rt. 5 in Los Angeles Co. Engineer's estimate $112,620. Bridge Dept., 1120 N. St., Sacramento.

192,433

$439,297.

Fla. Jacksonville. Duval Co. Apr. 11. Engineer's estimate $241,307. Duval Co. Courthouse. Deposit $100. Plans on file at office of Duval Co. Supervisor, Jacksonville. Approx. $200,000 contract; project cost, including fees, $250,000. Contracts awarded separately. Start May. Approx. 60 days. Lockwood, Andrews & Newnam, Inc., Eng., 1500 Main St., Houston. $300,730.

Md. Baltimore. Apr. 11. Engineer's estimate $179,370. Bureau of Engineering, 1149 S. Broadway, Los Angeles. $127,192.

Md. Baltimore. City Bureau Highways. Apr. 11. Engineer's estimate $114,042. Bureau of Engineering, 1149 S. Broadway, Los Angeles. $122,443.

$126,651.

Massachusetts. Bridge over Rouge River, Dearborn. Engineer's estimate $244,316. Wayne Co. Bldg., Detroit. $244,316.

▲ Michigan. Bridge over Rouge River, Dearborn. Engineer's estimate $314,930. Wayne Co. Bldg., Detroit. $314,930.

$44,765.

$355,342.

0.464 mi, Edsel Ford Expressway from Martin Ave. east to C. & O. Ry. Crossing, in Detroit, Proj. UI 82-64 C 1, UI 391.24(4), Wayne Co., from Cullen, Fourth & Sun Co., 712 Transportation Bldg., and Ingalls & Sivier, Inc., 2323 E. 8 Mile Rd., Detroit, $820,262 ****dual c. conc. median strip and concrete curb and gutter, 0.73 mi. Edsel Ford Expressway from Longe Ave. East to Martin Ave., Proj. UI 82-64, C. 12, UI 391.24(5), Wayne Co., from Cullen, Fourth & Sun Co., 712 Transportation & Gendron Constr. Co., Centerline, Inc. $1,379,285. CD 3/29.

New Hampshire—State Hy. Dpt., Concord, grading, drainage, surf. treated gravel 2.27 mi., U. S. 3, Proj. No. F1238 (7) towns of Lincoln and Franconia, from Landers & Griffin Inc., 602 Lexington St., Portsmouth, $158,697. CD 8/25/44.

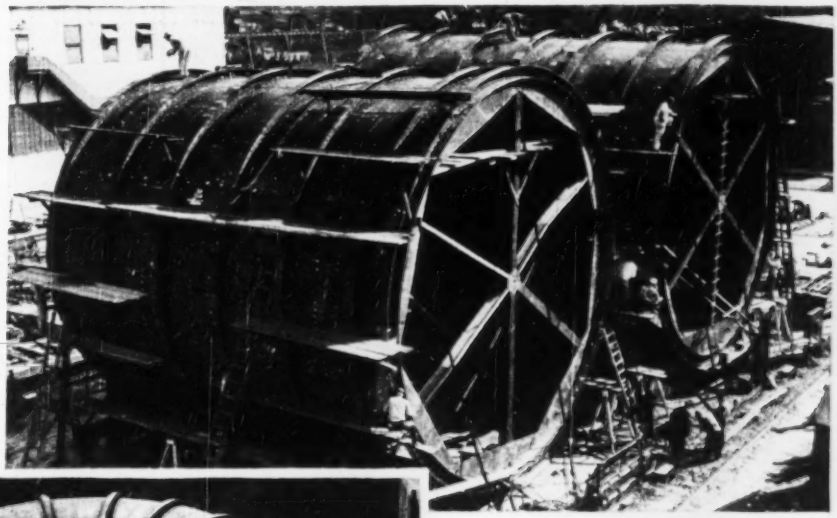
▲ New Jersey—New Jersey Turnpike Auth., War Memorial Bldg., Trenton, Contr. 16, grading, drainage & misc. new superhighway from Woodbridge to Carteret, to be over New York, Susquehanna & Western R.R. yards in Ridgefield, etc., Bergen Co., from George M. Brewster & Son, 275 W. Fort Lee Rd., Bogota, N. J., $6,840,082. CD 3/29.

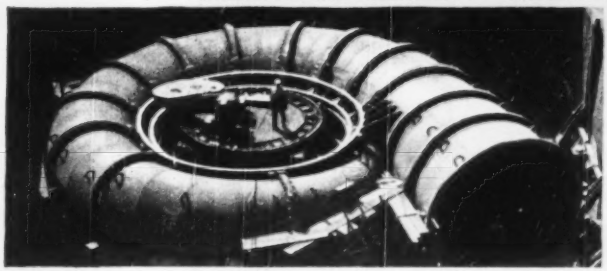
N. Y., Yonkers—At Lake Front van Rhijnbeck to E. Prof. Contract & Supply, 32-02 Fifty-Ninth Ave., L. I. C., grading, curb and sidewalk, sitzbaw inlets, sewers and laying streets to set, excavation, Cresent Ave., from Bracktop, Inc., Cedar St., Mt. Vernon, $132,474, CD 3/24.

▲ Tennessee—State Hy. Dpt., Nashville, Apr. 14, from Story Bros., Johnson City, 0.305 mi., U. S. 11E, State Rd. 34, Kingsport, from Walnut St., and extend, to the junction of State Hy. 93 and Walnut St., Proj. No. SAMP 121-C, Sullivan Co., $57,999. Bids 4-7, awarded 4-8.

Tennessee—State Hy. Dpt., Nashville, Apr. 14, from Story Bros., Johnson City, 0.305 mi., U. S. 11E, State Rd. 34, Kingsport, from Walnut St., and extend, to the junction of State Hy. 93 and Walnut St., Proj. No. SAMP 121-C, Sullivan Co., $57,999. Bids 4-7, awarded 4-8.

Tennessee—State Hy. Dpt., Nashville, Apr. 14, from Johnson City, 0.822





TO HARNESS THE ELEMENTS

SHOWN are shop erections of sections of a wind tunnel and a water turbine spiral casing at Newport News. One to be used in the development of America's planes of the future, the other to generate power in the world's largest hydro-electric development.

Tolerances required for the 34-foot diameter welded structure of the wind tunnel were: flushness or smoothness plus or minus 0.01"; fairness of structures 0.05" and up to ½" in diameter.

Eighteen of the 165,000 horse-power turbines at Grand Coulee have been built by Newport News. Nine sections of the casings are cast steel and six are welded and cast. These turbine units are the most powerful ever built.

Refractory towers, pressure-vessels, bridge caissons and other heavy equipment of special design are fabricated at Newport News. The plant, over a mile in length, includes welding and steel fabricating shops, machine shops, foundries and forge shop to provide the advantages of building the complete job.

"Facilities and Products" catalog will be sent if requested.

BUILDERS OF EQUIPMENT FOR CHEMICAL, PETROLEUM AND PETRO-CHEMICAL INDUSTRIES

NEWPORT NEWS

SHIPBUILDING AND DRY DOCK CO.

NEWPORT NEWS, VIRGINIA

(Continued from page 86)

† Washington—B. A. 5/10—U. S. Eng., 4735 E. Marginal Way, Seattle. Zone 4. 1,445 ft. groins and 1,400 ft. breakwater at Westhaven, Grays Harbor Co., CIVENG 40-70.

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AIRPORTS

BIDS ASKED

N. C., Hickory—AIRPORT—B. A. 5/2—City, City Hall, airport construction. Schedule 1: Al grubbing approx. 7.4 acres, B1 75,000 cu. yds. unclassified excav., C1 drainage struct., D1 placing duct work; (E) furnishing and processing sub-base material; Schedule 2: 90,200 sq. yd. stone base; Schedule 3: 90,300 sq. yd. surface course; Schedule 4: turfing 48 acres; Schedule 5: lighting, multiple system. Plans deposit $10. Wm. C. Oliver, 5 Exchange Pl., Raleigh, engr. CD 2/10/47.

† Fla., Tampa—CONTROL TOWER—B.A.—5/4—U. S. Eng., Post Office Bldg., Savannah, Ga., control tower, Winder Air Force Base, Serial No. ENG 08-133-50-69, extended date. CD 3/15.

Miss., Kessler—LIGHTING, etc.—B.A. 5/4—Purchasing & Contracting Office, Keesler Field Air Force Base, Biloxi, rehabilitate taxiway field lighting sys., Serial No. 22-050-50-22.

† Alaska, Fairbanks—HOUSES—B.A. 5/10—U. S. Eng., FAPO 942, c/o PM, Seattle, Wash.) Anchorage, fourteen 3-family row-type houses at Elmendorf Air Force Base, 95-507-50-22. Plans deposit $50.

LOW BIDDERS

Ala., Decatur—AIRPORT—City, Pryor Field Airport, from Between Greens Constr. Co., Athens. $119,549. Bids 4/7. CD 3/29.

▲† S. D., Rapid City—PARKING APRON—U. S. Eng., 1709 Jackson St., Omaha, Neb., Apr. 11, addl. parking apron at Rapid City Air Force Base, Serial No. Inv. 7, from Peter Kiewit Sons' Co., Omaha Natl. Bank Bldg., Omaha, Neb. $1,080,913. Est. $1,284,420. CD 3/15.

LATIN AMERICA

Bolivia, Santa Cruz—Direction General de Hidraulica Electricidad, engr., Ministry of Pub. Wks., La Paz, receiving bids May 27 for electric power plant for Rio Grande, La Paz. CD 6/14/46.

† Cuba, Havana—Dpt. of State, Foreign Buildings Operations, 21 and Virginia Ave. N. W., Wash. D. C., receiving bids for penthouse office bldg. for Embassy in United States. $850,000-$1,000,000. Harrison & Abramovitz, 45 Rockefeller Plaza, New York, N. Y. archits. Severud, Elstad & Krueger, 415 Lexington Ave., New York, N. Y., engrs.

PUBLIC BUILDINGS

BIDS ASKED

Conn., Ansonia—HOUSING—B.A. 5/2—City of Ansonia, Housing Authority, Ansonia, Conn., Inv. No. CIVENG [illegible], Zone 1, Apr. 11, [illegible] Ansonia, Derby, Seymour, Shelton, Monroe and Trumbull, Fla., [illegible] $490,000. Extended date. Henry T. Mosher & Son, 10 Roosevelt Ave., Naugatuck, engrs. CD 2/28.

Md., Easton—[illegible]—B.A. 5/2—State Road Comm., State Office Bldg., Annapolis, [illegible] Talbot County, [illegible] Easton, [illegible] 1,000 cu. yds. concrete, [illegible] 1,000 sq. yds. concrete block, [illegible] 1,000 sq. yds. [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Dozier—Marlboro—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Marlboro, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Tex., Bonita—[illegible]—B.A. 5/2—[illegible] Bldg., Austin, [illegible] Bonita, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Tex., San Marcos—[illegible]—B.A. 5/2—[illegible] Bldg., Austin, [illegible] San Marcos, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Quantico—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Quantico, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Upper Marlboro—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Upper Marlboro, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Warsaw—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Warsaw, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Wakefield—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Wakefield, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Waverly—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Waverly, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Wicomico—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Wicomico, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Williamsburg—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Williamsburg, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Woodbridge—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Woodbridge, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Yorktown—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Yorktown, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Zuni—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Zuni, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Accomac—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Accomac, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Alexandria—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Alexandria, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Amherst—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Amherst, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Appomattox—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Appomattox, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Arlington—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Arlington, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Bedford—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Bedford, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Berryville—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Berryville, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Big Stone Gap—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Big Stone Gap, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Blacksburg—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Blacksburg, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Bland—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Bland, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Boydton—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Boydton, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Brookneal—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Brookneal, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Buchanan—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Buchanan, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Buckingham—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Buckingham, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Burkeville—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Burkeville, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Cape Charles—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Cape Charles, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Chatham—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Chatham, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Chesapeake—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Chesapeake, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Chesterfield—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Chesterfield, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Clarksville—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Clarksville, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Colonial Beach—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Colonial Beach, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Courtland—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Courtland, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Culpeper—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Culpeper, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Dahlgren—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Dahlgren, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Dillwyn—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Dillwyn, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Dinwiddie—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Dinwiddie, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Drakes Branch—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Drakes Branch, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Emporia—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Emporia, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Fairfax—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Fairfax, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Falls Church—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Falls Church, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Farmville—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Farmville, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Fincastle—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Fincastle, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Fredericksburg—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Fredericksburg, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Front Royal—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Front Royal, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Gate City—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Gate City, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Gloucester—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Gloucester, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Goochland—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Goochland, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Gordonsville—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Gordonsville, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Grundy—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Grundy, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Hampton—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Hampton, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Harrisonburg—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Harrisonburg, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Hillsville—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Hillsville, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Hopewell—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Hopewell, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Independence—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Independence, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Irvington—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Irvington, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Jonesville—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Jonesville, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Kenbridge—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Kenbridge, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Keysville—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Keysville, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Kilmarnock—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Kilmarnock, [illegible] Plans deposit $10. [illegible] Engr. CD 3/17.

Va., Lancaster—[illegible]—B.A. 5/2—[illegible] Bldg., Richmond, [illegible] Lancaster, [illegible] Plans deposit $10. [

"QUALITY PLUS" HOIST

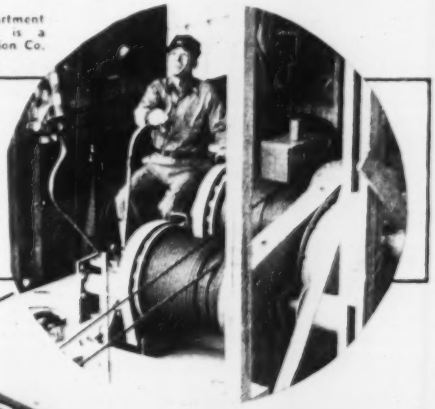
. . . KEEPS A "TIGHT LINE" ON MATERIAL HANDLING COST. For . . .

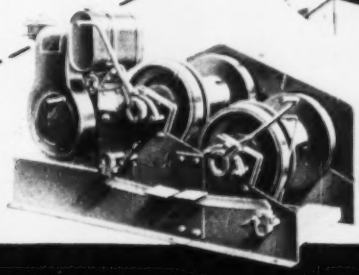
PAUL SMITH CONSTRUCTION COMPANY

THE selection of Clyde for the hoist-handling of all materials on this 210 unit apartment building again attests to the dependable performance of this Clyde "quality-plus" Frame 4 Hoist. The added safety of conveniently located controls and easier operation, lower power requirements due to ball bearing construction, and the honest-to-goodness quality of a Clyde Hoist assure greater productivity per man-hour and the elimination of "down-time" . . . the difference between profit and loss on a project such as this. If you want to stand toe to toe with competition and "stay in the black," it will pay you to drop a line requesting complete information on Clyde "quality-plus" Hoists.

This new 16 story, 210 unit apartment building in Jacksonville, Florida, is a project of the Paul Smith Construction Co.

Here is the two drum, Frame 4, fifty horsepower electric Clyde Hoist in operation on the job. Gasoline or diesel powered units are also available.





CLYDE "QUALITY-PLUS" FRAME 3 HOISTS

One and two drum models of Clyde Frame 3 Hoists have all the quality features of the larger Frame 4 Hoists. This unit is recommended for work where hoisting requirements do not exceed one and one-half ton capacity. Choice of power: gasoline, diesel or electric.

Frame 3-4 Clyde Hoists are also made in Canada

CLYDE IRON WORKS, Inc.

Subsidiary of Barium Steel Corp.

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Rolling Doors
for
ANY INDUSTRIAL NEED!

Whether needed in a large steel mill . . . or simply at a small warehouse loading-platform . . . KINNEAR can supply steel rolling doors to fit any requirement. These steel interlocking-slat curtains rise straight up and coil compactly above the lintel! And when shut they supply extra protection against fire, theft and the elements. Available with push-button motor operation from one or several strategic points. Write for details.

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Scranton, Pa. Dept. E, U. S. A.

Ont., Orillia—SCHOOLS—B.A. 5/4—Page & Steele, archts., 72 St. Clair Ave. W., Toronto; 2 story, brick, steel; Hillcrest School addn., 2 story, brick, steel; David W. Smith School addn., 16 x 225 ft; Mount Slowen School; for Board of Educ., Orillia. Approx. $375,000. Plans depost $50.

† North Dakota—SCHOOL—B.A. 5/5—U. S. Eng., Box 300, Fort Lincoln, Bismarck; temporary addn. to school, Riverdale. Serial No. CIVENG 32-015-50-68. CD 6/2/44.

O., Maple Heights—SCHOOL—B.A. 5/5—Bd. Educ., Lee and Broadway, Cleveland; 2 story, basmt., 12 room brick, block, stone, stucco school addn.; Stafford Rd. $200,000. W. O. Caldwell, Engineers Bldg., Cleveland, archt. CD 11/3.

† Ala., Tuskegee—LIVING HALL etc.—B.A. 5/9—Veterans Admin., Vermont Ave. between H and I Sts. N. W., 25, D.C.; Dining Hall and Kitchen Bldg. addn., alterations. Spec. 5007, Proj. 2931. CD 3/7/46.

Calif., Fresno—LABORATORY—B.A. 5/9—State Div. Architecture, P. Wks. Bldg., Sacramento; general contract, plumbing, heating, ventilating and refrigeration; and mill work. 1 story, wood frame with concrete floor slab; and animal diagnostic laboratory for Dpt. Agriculture. Plans deposit $25. Anson Boyd, Sacramento, state archt.

† Alaska, Galena—QUARTERS, etc.—B.A. 5/9—U. S. Eng., (APO 942, c/o PM, Seattle, Wash.). Anchorage; quarters for bachelor officers, NCOs and airmen; central heat and power plant; operations bldg.; warehouse and cold storage; vehicle maintenance; mess hall; recreation bldg.; dispensary and administration bldg.; POL station storage; outside utilities and roads for military installation. 595-507-50-13. Plans deposit $100.

Calif., San Mateo—AUDITORIUM—B.A. 5/10—San Mateo Union High School Dist., San Mateo; 37,900 sq. ft.; 1611 person seating San Mateo High School; motor-driven stage curtains; organ; orchestra pit. $1,000,000. Plans deposit $25. Leo J. Sharpe & Irving F. Brown, 131 Howard Ave., Burlingame, archts. CD 7/17/47.

† N. M., Moriarty—TRAINING CAMP SITE—B.A. 5/10—U. S. Eng., P.O. Box 1538, Albuquerque. Training Camp Site 35, Station P-51, Serial No. Eng-29-065-50-47. CD 3/1/49, under LB.

Tex., Palestine—HOSPITAL—B.A. 5/10—Anderson Co. Plaintiffs' Library 148 x 412 ft; 96-bed brick, limestone, stone, concrete steel hospital; concrete pier and beam fdn., etc.; air-conditioning. $710,000. Plans deposit $25. Theo S. Moffitt, 510 W. Sycamore St., archt.; Lindsley & Guerrero, 4801 Lemmon St., Dallas, engrs. CD 3/1/49, under LB.

LOW BIDDERS

▲ Calif., Chino—RECEPTION CENTER—State Div. Architecture, P. Wks. Bldg., Sacramento, Apr. 11; general contract 1, 2 and 3 story 147,000-sq. ft. reception center bldgs. at Chino State Prison; from Robt. E. Mayer, 14700 San Fernando Rd., West Los Angeles. $1,735,700. CD 3/18.

Calif., Long Beach—ARTS, etc.—City School Dist., 715 Locust Ave.; Apr. 13 arts, administration, life science and music bldg. at Long Beach City College; from Ernest Comer Co., 3445 Higuera St., Culver City. $936,000. Est. $922,000. CD 3/29.

† Calif., Los Angeles—KITCHEN, etc.—Veterans Admin., Vermont Ave. between H and I Sts. N. W., Wash. 25, D. C.; Apr. 18 kitchen and dining hall bldg., 100 Veterans Administration Center, Sawtelle. From Ceco Corp., from Bronzan Constr. Co., 3945 Hopkins St., Culver City. $839,462. CD 2/28.

▲ Calif., Redwood City—HOSPITAL—San Mateo Co., Courthouse; Apr. 11; 4 story, 200 bed reinforced concrete tuberculosis hospital, Twin Pines, 1 Bayview, Zeno E. Tarantino & Associates, Berkeley. $1,333,000. Doug. Wm. Co. & Wm. A. Mulloy, 614 California St., San Francisco, jointly.

▲ Conn., Bridgeport—HOUSING—City of, Bridgeport Housing Auth.; Anthony D. Criscuolo, Jr., Apr. 17, 500 brick dwelling units, Bon Court, from E. & F. Constr. Co., 94 Wells St. $3,744,000. CD 4/3.

Ga., Jonesboro—SCHOOLS—Clayton Co. Bd. Educ., Jonesboro; Apr. 12, 8 high schools, from W. B. Johnson, 711 Pitts'ne Ave., S. E., Atlanta. $651,218. CD 3/31.

† Ill., Chicago—HOSPITAL—Veterans Admin., Vermont Ave. between H and I Sts. N. W., Wash. 25, D. C.; General contract research hospital for Veterans Administration at Fire, Hines and Fairbanks St. and McClure St., from W. F. O'Neil Constr. Co. & Kenny Constr. Co., 111 W. Washington St. $12,352,300. Work to be completed in 670 days. From Ira Haupt & Co., 111 Broadway, N. Y., and Shapiro & Anapolsky Constr. Co., 1012-20 S. N. W. Ave., Chicago. $609,533. Marion B. Hom Machinery Elevator Co., Moline. $560,956. CD 2/16.

† N. Y., Watertown—BUILDINGS, etc.—U. S. Eng., 80 Lafayette St., New York, Zone 14; Apr. 6, building utilities; one new, from Calvetti, Inc., 50 Clinton St., Irvington. $657,722. CD 4/16.

† Vt., St. Albans—BUILDING, etc.—U. S. Eng., Army Base, Boston 10, Mass.; Apr. 12, buildings, utilities, Project 19-116-50-23, from Bennett-Hewitt, Inc., 100 Newbury St., Boston, Mass. $944,734. CD 3/9.

▲† Alaska, Naknek—MILITARY INSTALLATION—U. S. Eng., APO 942, c/o PM, Seattle, Wash.; Anchorage, Apr. 12; bachelor officers' quarters, non-commissioned officers' quarters, airmen's quarters, central heating and power plant; operations bldg.; warehouse and cold storage; vehicle maint. storage; mess hall; recreation bldg.; dispensary and admin. bldg.; POL station storage; outside utilities and roads for Naknek Proj. Spec. 595-507-50-13. From Jos. Gay Co., 1st Nat. Bank Bldg., Anchorage, Alaska. $1,766,677. CD 3/7.

CONTRACTS AWARDED

Calif., Los Angeles—GARAGE, etc.—Bd. Educ., 1425 S. San Pedro St.; 3 story, garage and office, 451 N. Hill St. to Alexander Construction Co., 35 N. Raymond Ave., Pasadena. $954,630. Bids 2/24, awarded 3/7. CD 3/6, under LB.

▲ Conn., Hartford—HOUSING—City of Hartford Housing Auth., Bee, Asylum St., 248 family units; Pope Heights Proj., Flatbush Ave., MR-1-A, to Anderson Fair Gas Constr. Co., 141 Marshall St., $1,250,000. Bids 4/11, CD 4/12, under LB.

Conn., Newington—HIGH SCHOOL—Town of Newington Bldg. Newington; 2 story, basmt., brick, steel high school, Cedar St.; from Gilbert & May Co., 2 Lewis St., Hartford. $805,140. Bids 3/28, under LB.

▲ La., Shreveport—HOUSING—Shreveport Housing Auth., W. Mason Bey, City Hall; Wallace Terrace Housing Proj., LA-2-2, to Farnsworth & Chambers, P. O. Box 74, Houston 1, Tex. $1,291,965. Bids 2/17, CD 2/24, under LB.

Mass., Greenfield—HOSPITAL—Franklin Co. Proj. Hospital, High St., hospital addns., alterations, High St., to T. J. Pernigotti Co., 171 Westminster St., Providence, R. I. $809,450. Bids 3/24, awarded 4/12, CD 4/4, under LB.

▲ Mass., Wellesley—SCHOOL—Town, High School Bldg. Comm., Junior High School, Kingsbury St., to Joseph Mazzicato, 164 Mystic Ave., Medford. $1,364,700. Bids 3/23, awarded 4/4, CD 4/3, under LB.

† New York—BUILDINGS, etc.—U. S. Eng., 641 Lafayette St., New York, Zone 14, buildings, utilities, Apr. 6; Project 19-116-50-23, to Jos. F. Sexner Co., 100 North Ave., Westfield, N. Y. $778,449. Bids 4/6, CD 4/6.

N. C., Asheville—HOUSING—Asheville Housing Auth., Asheville; Apr. 6, housing project, to Kenyon Constr. Co., 12 State St., Charleston, S. C. $558,865. Bids 4/5, CD 4/11, under LB.

N. C., Goldsboro—HOSPITAL—Wayne Memorial Hospital, V. G. Herring, chm., Bd. Trustees; basement, 100-bed hospital addn. and heating plant bldg., to Bowling & Co., Bank of Wayne Bldg., $551,776. Bids 4/18, CD 4/18, under LB.

▲ Pa., Hollidaysburg—HOSPITAL—General State Auth., 18 and Herr Sts., Harrisburg; general contract hospital bldg. at Hollidaysburg State Hospital, to McGinley & Co., 1620 W. Thomas St., Phila. $1,038,000. Bids 4/12, awarded 4/18, CD 4/14, under LB.

▲ R. I., Providence—HOUSING—Providence Housing Auth., Joseph P. Carroll, chm., 263 Chad Brown St., 24 buildings, Housing Proj. RI-1-1A, Admiral Terrace, to Turner Construction Co., 614 Burks Head Bldg., $2,184,747. Bids 4/14, Grant, Keith, Mather, Crane & Allinson, 903 Industrial Trust Bldg., archts.

▲ Wash., Richland—SCHOOL—School Bd., Richland, Chief, Joseph Junior High School, to S. S. Mullen, Inc., 621 4 Ave. N., Seattle. $1,418,900. Bids 3/17, CD 3/24, under LB.

▲† Alaska, Anchorage—MILITARY INSTALLATION—U. S. Eng., (APO 942, c/o PM, Seattle, Wash.) Anchorage, military installation at Fire Island, 595-507-50-6, to The Ceco Corp., The Rookery, 314 Montgomery St., San Francisco, Calif. $2,685,795. Est. $2,477,362. Bids 3/14, CD 3/23, under LB.

▲† Alaska, Fairbanks—MILITARY INSTALLATION—U. S. Eng., APO 942, c/o PM, Seattle, Wash.; Anchorage, bachelor officers' quarters, airmen's barracks, central heating and power plant, operations bldg., recreation bldg., at Murphy Dome, Fairbanks Proj., to Morrison-Knudsen Co., Inc., 319 Broadway, Boise, Idaho and Peter Kiewit Sons' Co., 1300 Alpha St., Seattle, Wash. $3,113,113. Est. $2,447,502. Bids 3/15, CD 3/27, under LB.

COMMERCIAL BUILDINGS

BIDS ASKED

Mass., Worcester—CHURCH—B.A. 5/1—Trinity Lutheran Parish, 43 Belmont St.; 1 story, basmt., brick, stone church; $250,000. Jens Frederick Larson, 331 Madison Ave., New York, N. Y., archt.

Pa., Upper Darby—DEPARTMENT STORE—B.A. 5/1—John H. McClatchy, McClatchy Bldg., department store, $500,000. Erling H. Wenge, c/o owner, archt. CD 4/14.

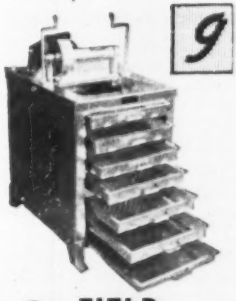
Me., Waterville—HOSPITAL—B.A. 5/2—Thayer Memorial Hospital, 216 Main St., hospital addn., $1,000,000. H. K. Cole & Assoc., 38 Seabury St., Boston, Mass., archts.

La., New Orleans—HOTEL—B.A. 5/3—Jung Hotel, 614 Aline St., alterations, archts., 611 Common St., 28 story hotel addn. Extended date, CD 4/4.

La., New Orleans—SCHOOL—B.A. 5/3—St. Mary of the Angels Parish, c/o Jules N. de la Vergne, archt., 413 Pere Marquette Bldg.; selected list, builders; 1 story, 46,100-sq. ft. parochial school and gymnasium, Gravier St. and Tonti St. CD 4/20.

▲ N. Y., New York—HOSPITAL—B.A. 5/5—Mt. Sinai Hospital, Fifth Ave. and 100 St., hospital and laboratory, $7,000,000. Extended date, Kahn & Jacobs, 2 Park Ave., archts. York & Sawyer, 101 Park Ave., consult. archts.; Fred M. Severud, 415 Lexington Ave., engr. CD 1/19.

Wis., Milwaukee—HOSPITAL—B. & S.—Columbia Hospital, 4121 N. Maryland Ave., Zone 11, 4 story, 594,135 ft., steel, brick, fireproof addn., concrete



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LABORATORY Service

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GILSON SCREEN CO.
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▲Que., Beaconsfield—APARTMENT—J. A. Dakin, 217 Chester Ave., Mount Royal, apartment house units on site of Drummond Farm. Owner bldg. $1,500,000.

▲ Que., Rosemount (Postal Dist. Montreal)—COTTAGES—Continental Housing Corp., 148 Sue Lief Bldg., Montreal, one hundred and forty-six 1 story, 24x24 ft., concrete brick cottages on 31 and 35 Aves., to T. C. Constr. Co., 7109 Chambord St., Montreal. Approx. $1,036,000.

INDUSTRIAL BUILDINGS

BIDS ASKED

Pa., Pennsburg—FACTORY—B.A. 5/1—Construct sheet, Inc., archt., Security Trust Bldg., Pottstown. Invites list bidders; factory for Pennsburg Knitting Mfg. Co., Pennsburg. $125,000.

Ky., Bowling Green—WAREHOUSE, etc.—B.A. 5/3—Warren Co. Rural Electric Coop. Corp., Bowling Green. 1 story, brick construction. Receiving bids; and storage bldg., parking area. $75,000. CD 5/2. Lister Unclassified, Inc., 345 New Center Bldg., Detroit, Mich., central and storage bldg. Extended April 20. 4113

La., North Baton Rouge—PLANT—B.A. 4/27—Kaiser Corp., c/o Albert Kahn Assoc., Architects & Engineers, Inc., 345 New Center Bldg., Detroit, Mich., central and storage bldg. Extended April 20. 4113

Tenn., Chattanooga—TERMINAL—B.A. 5/3—Dixie Greyhound Lines, c/o Otis Aldred & Associates, archts., 29 Marietta Street Bldg., Atlanta, Ga. Truck freight terminal. CD 2/20.

Wis., Milwaukee—WAREHOUSE, etc.—B.A. 5/4—Pittsburgh Plate Glass Co., 215 E. Pittsburgh Ave., one 4 story, [illegible] and one 1 story, [illegible] brick warehouse, office, concrete tilt-slab and brick construction. 411 N. Broadway, Milwaukee. W. R. Ryan, archt., 411 N. Broadway, Milwaukee. Bids to be received under LD.

Conn., Saybrook—FACTORY—B.A. Assoc., Platt Road, Co., engrs., 1 story, [illegible] brick construction, [illegible] Jacobus, Inc., 1 Church St., New Haven, archt. & engr., Westport & Wallingford. Invites bids from New Haven archt.

Conn., Waterbury—WAREHOUSE—[illegible] Waterbury, A. [illegible] Bank [illegible] City, [illegible] brick construction, [illegible] $110,000. Albert H. Scott, 5 [illegible] St., Waterbury, archt.

Kan., Kansas City—PLANT—[illegible] Allied Mfg. Co., [illegible] Kansas City, Mo., [illegible] City, Kan., [illegible] Kayler and Lee Minneapolis Ave., Kansas City, Mo., [illegible] to [illegible] manufacturing plant. $300,000.

Pa., Philmont—INDUSTRIAL—B.A. Addn.—John A. Power, archt., 24 York Rd., Abington. Inviting list bidders; industrial bldg. for J. A. P. Approx. $150,000.

SOON LETS CONTRACT

Ill., Chicago—[illegible] Inc., 111 W. Chestnut St., [illegible] Co., 2400 [illegible] Ave., [illegible] Contract 2, [illegible] operations bldg., $750,000. Battey & Childs, 231 S. LaSalle St., [illegible] CD 2/8.

Ia., Sioux City—PLANT—A.M.A. Co., 3315 S. Parker St., [illegible] Co., [illegible] packing and [illegible] $1,000,000. CD 3/23.

N.C., Charlotte—PLANT—The Kendall Mfg. Co., [illegible] J. [illegible] Engineers, [illegible] Approx. $1,000,000. J. N. Pease & Co., [illegible] archt.

O., Avon Lake—[illegible] FACTORY—B.A. [illegible] Co., [illegible] Bldg., [illegible] Approx. $500,000. [illegible] Bldg., Cleveland. [illegible] Bldg., Cleveland, archt. [illegible] Job Mfg., Cleveland. $500,000.

CONTRACTS AWARDED

▲ N. J., Kenilworth—MANUFACTURING—[illegible] Laboratories, 111 N. [illegible] Ave., Chicago, Ill., [illegible] Laboratories, Inc., [illegible] Ave., Kenilworth, N. J., [illegible] Approx. $3,000,000. A. M. Kinney, Inc., Engineers Bldg., Cincinnati, archt.

▲ Alta., Edmonton—[illegible] Edmonton, [illegible] Ltd., [illegible] Ave., Edmonton, [illegible] Ltd., [illegible] Ave., Edmonton, [illegible] $10,000. CD 1/2. [illegible] Ltd., [illegible] Ave., Edmonton, [illegible] $10,000. CD 1/2.

▲ Ont., Toronto—[illegible] Ltd., [illegible] Ave., Toronto, [illegible] Ltd., [illegible] Ave., Toronto, [illegible] Ltd., [illegible] Ave., Toronto, [illegible] $1,250,000. CD 12/26.

▲ Sask., Regina—[illegible] Co., [illegible] Regina, [illegible] Co., [illegible] Regina, [illegible] Co., [illegible] Regina, [illegible] Approx. $1,500,000. [illegible] Ltd., [illegible] Ave., Regina, [illegible] N. Boston St., Tulsa, Okla. CD 2/27.

UNCLASSIFIED

BIDS ASKED

British Columbia—RAILWAY TIES—B.A. 5/1—[illegible] Ltd., [illegible] Ave., [illegible] B.C. [illegible] Ltd., [illegible] Ave., [illegible] B.C. [illegible] Ltd., [illegible] Ave., [illegible] B.C. [

OFFICIAL PROPOSALS
(Continued from page 92)

Bids: May 15, 1950 (7511)

Intercepting Sewer

Sealed proposals will be received at the office of the Department of Service and Buildings of the City of Dayton, State of Ohio until 12:00 o'clock noon Eastern Standard Time, Thursday, May 11, 1950, for furnishing all materials and constructing Sections H and III of an Intercepting Sewer in the bed of the Great Miami River from Fifth Avenue to Webster Street, and thereafter will be publicly opened and read.

These sections consist principally of approximately 1423 feet of reinforced concrete box sewer 2'-3" x 11'-3", 527 feet of box sewer 2'-3" x 9'-0", one buried siphon under the Great Miami River consisting of two 30 inch and one 36 inch pipes and one 42 inch pipe, one 108 inch pipe sewer and 168 feet of 24 inch pipe sewer. The sizes mentioned herein refer to the finished or embedded dimensions of the two sections as a unit.

It is to be assumed that the total cost of the improvement will not exceed $2,772,772.88. Bid shall be accompanied by a certified check upon some solvent bank or a bond executed by a surety company authorized to do business in Ohio or a bond of the United States or the City of Dayton for a sum equal to ten percent of the amount bid and a guarantee that if the bid is accepted that a contract will be entered into and its performance properly secured. Plans, specifications and proposal forms may be obtained from the City Engineer, 208 Municipal Building, Dayton 2, Ohio, upon payment of $2.00 per set. Checks shall be made payable to the City of Dayton. Refund will be made for return of plans and specifications. The City reserves the right to reject any or all bids or to accept the proposal which appears most advantageous.

George E. Baker,
Director of Service and Buildings
Municipal Building
Dayton 2, Ohio

Bids: May 17, 1950 (7509)

Construction of Right-of-Way Fence

PENNSYLVANIA TURNPIKE COMMISSION
Harrisburg, Pennsylvania
NOTICE TO BIDDERS

Sealed proposals will be received by the Pennsylvania Turnpike Commission, through the Chairman, 17 North Fourth Street, Harrisburg, Pennsylvania, until 2:00 P.M. (Eastern Daylight Saving Time) the 12th day of May 1950 and immediately thereafter will be taken to the Public Utility Commission Hearing Room 1, North Office Building, North Street, Harrisburg, Pennsylvania, and publicly opened and read aloud for the following contract:

For the construction of Right-of-Way Fence on the Philadelphia Section of the Pennsylvania Turnpike System. This work extends from a point near Middlesex, Cumberland County, Pennsylvania to approximately one mile east of Valley Forge, near King of Prussia, Montgomery County, Pennsylvania, a distance of approximately 20 miles.

The work consists of placing Right-of-Way Fencing and the appurtenant items. Also of the various types of fence are as follows:

Type 1 ..... 20,672 lin. ft.
Type 2 ..... 29,951 lin. ft.
Type 2A ..... 2,500 lin. ft.
Type 3 ..... 1,000 lin. ft.

Copies of plans, specifications and other contract documents will be on file and open to public inspection at the office of the Pennsylvania Turnpike Commission, Harrisburg, Pennsylvania on 21 April 1950. Plans, specifications and other contract documents will not be available for the purpose of bidding.

Plans and contract documents including specifications may be obtained from the Commission upon deposit of Ten ($10.00) dollars for each set, such deposit to be refunded in full to any bidder upon delivery of such set in good condition within ten days after the date of the opening of bids and to any non-bidder upon delivery of such set in good condition within ten days after the date of the opening of bids and upon return of the bid submitted by such non-bidder if the project is withdrawn from letting by the Pennsylvania Turnpike Commission. Remittances are payable to the Pennsylvania Turnpike Commission and must accompany requests for drawings, specifications and contract documents.

Bids will only be received from established manufacturers of Chain Link Type Fence (R.W. Fencing Type D) and/or Farm Fence (R.W. Fencing Type 2).

The character and amount of bid security to be furnished by bidder is stated in the Instructions to Bidders.

No bids may be withdrawn for thirty (30) days after the scheduled closing time for receipt of bids.

PENNSYLVANIA TURNPIKE COMMISSION
James E. Tarbox
Secretary and Treasurer
Harrisburg, Pennsylvania
April 18, 1950

Bids: May 22, 1950 (7513)

Alterations & Addition to High School

NOTICE TO CONTRACTORS

Alterations and Additions to Present High School, Willow Road, Scarsdale, New York.

Sealed proposals and specifications to the State Education Department, Albany, New York, separate contracts for General Construction Work, Heating and Ventilating Work, Plumbing Work and Electrical Work for the construction of alterations and additions to present high school building and a new Primary School Building in accordance with plans and specifications, will be received by the Board of Education of the Union Free School District No. 2 of the Towns of Bedford and Pelham, Westchester County, New York, at the office of the present Junior High School, District No. 2, Willow Road, Scarsdale, New York, until 10:00 o'clock A.M. May 22, 1950, at which place and time they will be publicly opened and read aloud.

The Information for Bidders, Form of Bid, Plans and Specifications may be examined at the office of Carpenter and Ratcliffe, Architects, 30 Rockefeller Plaza, Rockefeller Center, New York, and copies thereof obtained upon payment by certified check, payable to the Architects, of $25.00 for each set, for each building. Any bidder upon returning such set promptly and in good condition, will be refunded his payment. Any non-bidder upon returning such set promptly and in good condition will be refunded his payment of $10.00 for each set so returned. Each set will be provided with a bid form.

The Board of Education of the Union Free School District No. 2 reserves the right to waive any informalities in or to reject any or all bids.

Each bidder must deposit with his bid security in the amount of not less than five per cent (5%) of the amount bid in the form and manner required by the Information for Bidders.

Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wage rates to be paid under the contract.

Proposals shall be on blank forms furnished by the Architect prepared as set forth in Information for Bidders enclosed in sealed envelope bearing the name and address of the bidder and the name of the work for which the enclosed proposal is for.

No bidder may withdraw his bid within thirty days after the actual date of the opening thereof.

High School Plans available April 28, 1950.

Primary School Plans available April 28, 1950.

By Elizabeth K. Copeland
District Clerk

Bids: May 22, 1950 (7501)

The Delaware Memorial Bridge

NOTICE TO BIDDERS

Sealed proposals for construction of the Delaware Memorial approach to the Delaware Memorial Bridge over the Delaware River near Wilmington, Delaware, will be received by the Delaware State Highway Department at the office of the Director, Delaware Crossing Division, Municipal Airport, Wilmington, Delaware, until 11 o'clock A.M., Eastern Standard Time, on Tuesday, May 2nd, 1950, and then immediately thereafter be publicly opened and read in the Council Chamber, Wilmington City Hall.

The work involves the following principal quantities:

[illegible]

OFFICIAL PROPOSALS

[illegible]

(Continued on page 94)

CONTRACTORS WATCH THIS SECTION

for New Projects

Publish your announcements thru the "Proposal Section" of Engineering News-Record and get their bids.

U. S. Government
(Continued from page 93)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. 2825) will be received by Bureau of Reclamation, Mooreroft, Wyoming, May 23, 1950, and then publicly opened for furnishing labor and materials and performing all work for the construction of Keyhole Dam, Keyhole Unit, Missouri River Basin Project. The work is situated about 19 mi northeast of Moorcroft, Wyoming. Principal items are approximately: excavation, 1,700,000 cu yds; embankment, 1,267,000 cu yds; riprap 45,000 cu yds; 7,500 cu yds concrete; and other work. Time allowed for completion will be 450 days. For particulars address Bureau of Reclamation, Moorcroft, Wyoming; or Building 1-A, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner.
(6973)

OFFICIAL PROPOSALS

Bids: May 16, 1950 (7049)

State Road Work

NOTICE TO CONTRACTORS—STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y. Pursuant to the provisions of Highway Law, as amended, and special provisions for projects financed with federal aid funds, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern standard time on Wednesday, May 10, 1950 by Henry A. Colon, Director, Bureau of Contracts & Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects; Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts & Accounts, Albany, N. Y., and at the office of the District Engineers noted below and may also be seen at the office of the Superintendent of Public Works, 270 Broadway, New York City.

The deposit for plans and proposal forms for each contract containing 1 to 15 sheets is $10.00; 16 to 20 sheets, $15.00; 20 to 50 sheets, $25.00; 50 to 100 sheets, $50.00; over 100 sheets, $100.00. A refund will be made to bidders for the return of same unsoiled condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

County	Contract No.	Name of Road	Miles	Type	Estimated Deposit	Estimated Cost of Work
		DISTRICT No. 1				
		G. L. Nickerson, Dist. Engr., 333 Broadway, Albany, N. Y.				
Essex	FASP 50-1	Tahawus-Wilmox Road, Pt. 1 & 11 & 44 co. Rd. Proj. 5804-2	8.5	B. S. B.C. Treat. Graded Gravel	$15.000 Plans $15	$124,000
Saratoga	RC 50-15	Ballston-Malta Road, Mills, 1.94 S. H. 5581, Ballston-Ballston Lake, Pt. 2, S. H. 5085	1.94	8" Con. Conc. Pave. Part 20'-22' Wide = 1.92 sq. Misc. Work = 0.02 mi.	$15,000 Plans $10	$270,000
		DISTRICT No. 3				
		Wm. Robinson, Dist. Engr., 301 E. Water St., Syracuse, N. Y.				
Oswego	FARC 50-11	Union Square-Pulaski, Pt. 1 & 1a, 2, S. H. 5084, 5221, Pulaski-Sandy Creek, S. H. 5215 Proj. 1, 1.46 & 3.27	15.27	Asph. Conc. Type 1A, 6M	$95,000 Plans $25	$1,735,000
Oswego	FAS 3H 50-5	New Haven-Texas, Pt. 2, 3, 50 Proj. 5233-2	3.50	9" Con. Conc. Pave. 24' Wide Road Con. Slab Br. 26' Span	$32,000 Plans $10	$589,000
		DISTRICT No. 4				
		A. R. Williams, Dist. Engr., Barge Canal Terminal, Rochester, N. Y.				
Genesee	FAS 3H 50-6	Alba-Byron, Pt. 3 Proj. 5235-2	0.87	Bit. Mac. Opt. Bit. Mix. 1 Base 2 Surface 35' 9½"	$6,000 Plans $10	$108,000
		DISTRICT No. 6				
		H. F. Bowen, Dist. Engr., 50 West Main St., Hornell, N. Y.				
Schuyler	FARC 50-14	Montour Falls, S. H. 5190 & 65 Proj. 1-6-72		Asph. Conc., Type 1-A, Opt. Alpha 1 Base 22' Sup. Alpha 18'	$18,000 Plans $10	$308,000
Steuben	FARC 50-12	Bloomfield-Keuka, S. H. 536 & 5032, Wayne-Keuka, Keuka-Penn Yan, Pt. 1, S. H. 3579 Proj. 1-6-73		Asph. Conc., Type 1-A, Opt. = 8.26 Mi. Misc. Work = 0.10 Mi.	$65,000 Plans $15	$1,213,000
Tioga	RC 50-13	Richford-Center Lisle, Pt. 1, 3, 5 & 8, S. H. 841		Bit. Mac. Opt. Bit. Mix = 5.08 Mi. Misc. Work = 0.01 Mi.	$16,000 Plans $15	$286,000
		DISTRICT No. 8				
		J. S. Boice, Dist. Engr., Pleasant Valley Road, Poughkeepsie, N. Y.				
Ulster	RC 50-17	New Paltz-Plattekill, S. H. 846 & 852		Asph. Conc., Type 1A, 6M	$5,200 Plans $10	$84,000
		DISTRICT No. 10				
		J. J. Dorn, Dist. Engr., Mineola (P.O. at Little E. Neck Road, Babylon, L. I., N. Y.				
Bronx	FA MHE 50-1	Major Deegan Expressway, I-87 Cont. 4A, Van Cortlandt Park to Co. Line, Yonkers to Proj. Limits		Grading & Misc. Work	$25,000 Plans $10	$441,000

Proposal for each contract must be submitted in accordance with the instructions contained in the contract proposal. Each proposal must be accompanied by a certified check, payable to the order of the State Comptroller, New York, Commissioner of Taxation & Finance, in the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of The Highway Law as set forth in "Instructions to Bidders."

Which optional types are permitted on contracts with federal funds, bidders must state in the space provided in the proposal the exact designation of the optional type on which the bid is scheduled.

The right is reserved to reject any or all bids.

H. H. TALLAMY,
Supt. of Public Works

U. S. Government

Notice to Contractors

GENERAL SERVICES ADMINISTRATION
Community Facilities Service
Washington 25, D. C.

Sealed proposals will be received by Rufe B. Newman, Jr., Deputy Commissioner for Engineering and Construction, Community Facilities Service, General Services Administration, Room 5143, General Services Building, Washington 25, D. C., until 11:00 o'clock, A.M. Eastern Standard Time, on May 17, 1950, for the construction of the following work at Charlotte Amalie, St. Thomas, Virgin Islands, comprising approximately the following quantities in the major items:

PROJECT NO. 53-306—WATERFRONT IMPROVEMENTS
ST. THOMAS, VIRGIN ISLANDS

3,500	cu. yds., Rock Fill
1,500	sq. yds., Grouted Riprap
3,200	lin. ft., Wood Piles
111,000	sq. ft., Steel Sheet Piling
134,000	lbs., Tie Rods
325,000	lbs., Steel Reinforcement
4,000	lin. ft., Creosoted Timber Guard Rail (8" x 10")
2,200	cu. yds., "A" Concrete
339,000	cu. yds., Earth Fill
3,500	lin. ft., Pipe in Storm Sewers (15" to 30")
1,200	cu. yds. Rubble Masonry
20	Manholes, Inlets and Catch Basins
2,700	lin. ft. Combined Curb and Gutter
27,000	sq. yds. of Concrete Pavement

At which time and place the proposals will be publicly opened and read aloud. Bids received after closing time of bid opening will be returned unopened.

Plans and specifications and other proposed contract documents are open for public inspection at the District Engineer's Office, Charlotte Amalie, St. Thomas, Virgin Islands, the District Engineer's office, 501 Ballaja Popular Building, San Juan, Puerto Rico, and Room 5130, General Services Building, Washington, D. C.

A set of such documents may be procured from the office of R. L. Kenan & Associates, Consulting Engineers, Bell Building, Montgomery, Alabama upon deposit of $40.00, of which will be refunded to bona fide bidders upon the return of plans and specifications, in good condition, within seven days from date of bid opening.

To parties who procure plans and specifications upon payment of $40.00 and who do not submit a bid, $30.00 will be refunded *provided same are returned within ten days from date of bid opening. No refund will be made for return after this time.*

Each proposal must be accompanied by a bid security in an amount of not less than 5 per cent of the total bid.

The successful bidder will be required to furnish a performance bond in an amount equal to 100 per cent of the contract price, and a payment bond in an amount equal to 100 per cent of the contract price, such bonds to cover full performance of the contract and payment for labor and materials. No proposal may be withdrawn after the scheduled closing time for receipt of bids for at least 30 days.

The Government reserves the right to reject any and all proposals and to waive informalities with respect thereto.

PERE P. SEWARD,
Commissioner
(6851)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (specifications No. 2988) will be received by Bureau of Reclamation, Denver, Colorado, May 11, 1950, and then publicly opened for furnishing 8 horizontal shaft single pump and motor units, as follows: 2 pumps with a capacity of 55.5 cfs under a total head of 24 ft., 2 pumps with a capacity of 59.4 cfs under a total head of 14 ft., and 2 pumps with a capacity of 45 cfs under a total head of 16 ft., for Pilot Pumping Plant, Columbia Basin Project, Washington. Delivery is desired within 150 days. For particulars, address Bureau of Reclamation, Building 1-A, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner
(6971)

(Continued on page 95)

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OFFICIAL PROPOSAL

RATE: $[illegible] per line (including [illegible] per insertion.

CLOSING DATE: [illegible] p.m. Friday to issue of following Thursday.

SEND COPY: [illegible] Engineering Publication, Engineering-News-Record, 330 W. 42nd St., New York 18, N. Y.

OFFICIAL PROPOSALS
(Continued from page 94)

Bids: May 9, 1950 (7021)

New Jersey Turnpike Authority

Sealed proposals will be received by the New Jersey Turnpike Authority at 167

CONTRACT No. 25

The work to be performed under this Contract includes the construction of twelve (12) steel and concrete underpass and highway bridges in connection with the construction of the New Jersey Turnpike, between Prospect Plains and the Raritan River in Middlesex County, New Jersey.

Principal items of work include:

Open Foundation Excavation, 6,450 Cu. Yds.; Concrete, 30,200 Cu. Yds.; Reinforcement Steel, 1,200,000 Lbs.; Structural Steel, 4,500,000 Lbs.; Timber Piles, 12,500 Lin. Ft.; Raking, 7,0 Lin. Ft.; Pipe Piling, 2,470 Lin. Ft.; Pipe Conduit, 13,500 Lin. Ft.

Contract documents may be seen, and may be inspected by prospective bidders during office hours, on and after April 18, 1950 at the office of the New Jersey Turnpike Authority, 67 Prospect Street, Trenton, New Jersey, and at the office of the Engineer, Parsons, Klapp, Brinckerhoff & Douglas, 165 Madison Street, Hackensack, New Jersey.

Contract documents will be furnished to each prospective bidder upon application to the Authority at the above address. No deposit will be required and contract documents are not required to be returned.

CONTRACT No. 28

The work to be performed under this Contract includes the construction of twelve (12) steel and concrete underpass and highway bridges, grading and surfacing forty (40) miles of new dual-lane highway, and other incidental work, including the construction of certain grade separations and the relocation of certain existing highways, railroads and utilities, in connection with the construction of the New Jersey Turnpike between the Woodbridge Interchange and the Delaware River, including the crossing of the New Jersey Turnpike over the Penn-Central Railroad (New York-Capital Railroad) in New Jersey (mile 0, Bethlehem Township to Bridgeton Township, Burlington County, New Jersey).

Principal items of work include:

Regular Excavation, Earth, 2,300,000 Cu. Yds.; Borrow Excavation, Earth, 2,300,000 Cu. Yds.; Concrete, 30,000 Cu. Yds.; Reinforcement Steel, 1,000,000 Lbs.; Structural Steel, 1,000,000 Lbs.; Timber Piles, 10,000 Lin. Ft.; Pipe Piling, 1,000 Lin. Ft.; Pipe Conduit, 15,000 Lin. Ft.; Pipe Drains, 30,000 Lin. Ft.; Corrugated Metal Pipe Culverts, 2,000 Lin. Ft.; Reinforced Concrete Pipe Culverts, 2,000 Lin. Ft.; Concrete Pipe Sewers, 1,000 Lin. Ft.; Vitrified Clay Pipe Sewers, 1,000 Lin. Ft.

Contract documents may be seen, and may be inspected by prospective bidders during office hours, on and after April 18, 1950 at the office of the New Jersey Turnpike Authority, 67 Prospect Street, Trenton, New Jersey, and at the office of the Engineer, Parsons, Klapp, Brinckerhoff & Douglas, 165 Madison Street, Hackensack, New Jersey.

Contract documents will be furnished to each prospective bidder upon application to the Authority at the above address. No deposit will be required and contract documents are not required to be returned.

Proposals will be received at the office of the New Jersey Turnpike Authority, 67 Prospect Street, Trenton, New Jersey, until 11 A.M. (Eastern Daylight Saving Time) on May 9, 1950, at which time and place they will be publicly opened and read.

The receipt and opening of proposals for subject to project premature of the bidder in accordance with regulations adopted by the New Jersey Turnpike Authority. Bidders must submit with their proposal a revised financial statement and a statement of plan and equipment.

Proposals must be made upon the standard proposal forms in the manner designated in the Standard Specifications for Construction of the New Jersey Turnpike and must be enclosed in sealed envelopes addressed envelopes bearing the name and address of the bidder and the number of the contract on the outside, and must be accompanied by a certified check drawn to the order of the New Jersey Turnpike Authority and/or proposal bond, each as set forth in Section 27 of the General of the proposal. Each proposal must be for not more than $200 in excess and must be delivered with proposal on or before the hour named. Copies of the proposal form to be used for submitting proposals, of the form for proposal bond, of the form to be used for financial statement and data and equipment statement to be submitted with proposal, and of the plans and specifications may be examined at or obtained from the office of the Engineer.

The Contractor will be awarded or proposals received within sixty (60) days from the date of opening of proposals. The right is reserved to reject any or all proposals.

NEW JERSEY TURNPIKE AUTHORITY
Paul R. Troast
Chairman

April 12, 1950

Bids: May 17, 1950 (7023)

Water Supply Improvements

CITY OF NIAGARA FALLS, NEW YORK
CONTRACT "C" INTAKE STRUCTURE AND TUNNEL

Sealed proposals will be received by the City Manager of Niagara Falls, New York, at his office in said City not later than 10:00 A.M. Eastern Daylight Saving Time on May 17, 1950, at which place and hour they will be publicly opened and read, and a contract awarded as soon thereafter as practicable to the lowest responsible bidder, for the construction of a water intake tunnel, shaft and intake structure.

The work will comprise approximately 525 feet of tunnel, 8 feet 6 inches in diameter, lined with 12 inches of concrete, a vertical concrete lined shaft and a reinforced concrete intake structure.

All work shall be in accordance with the Instructions to Bidders, Form of Agreement, Specifications, Plans and Contract Bond now on file in the office of the City Clerk, New York and at the offices of Greeley and Hansen, Engineers, 222 South Michigan Avenue, Chicago, Illinois, and of Metcalf & Eddy, Engineers, 201 Devonshire Street, Boston, Massachusetts. Copies of the Instructions to Bidders, Form of Agreement, Specifications, Plans and Contract Bond may be obtained at the office of the Engineers upon the deposit with each office of the sum of $25.00 for each set. The sum will be refunded to each bidder who submits a bona fide proposal and returns the documents in good condition within ten days after the opening of bids.

A non-refundable fee of $10.00 must be paid for the privilege of bidding. Checks should be made payable to the City Manager, City of Niagara Falls, New York.

The Contractor shall not be permitted to assign, sublet or transfer any interest in the contract without the written consent of the City.

The City reserves the right to waive any informalities in or reject any or all bids, and to accept the bid which it deems most favorable to the interest of the City after all bids have been considered.

CITY OF NIAGARA FALLS
(Signed) Walter Wick
Acting City Manager

Dated: April 19, 1950

U. S. Government

Notice to Contractors

GENERAL SERVICES ADMINISTRATION
Community Facilities Service
Washington 25, D.C.

Sealed proposals will be received by Lieut. H. Newsom, Jr., District Public Works Construction Officer, Department of the Army, Corps of Engineers, Public Works Construction Division, Caribbean Area, Room 200, Federal Building, Washington, D. C., until 11 o'clock A.M., Eastern Standard Time, on May 24, 1950, for the construction of telephone and radio link facilities and buildings on the islands of St. Thomas and St. Croix, U. S. Virgin Islands, as follows:

PROJECT No. 8-VIS, ST. THOMAS TELEPHONE SYSTEM
(Project No. 13, Public Law 516, 78th Congress)

U. S. Government

Subproject 13A — Outside Telephone Plant, St. Thomas

Subproject 13B—Inside Telephone Plant, Charlotte Amalie

Subproject 13C—Subscriber Telephone Plant, St. Thomas

Subproject 13R—Radio Link Station, Virgin Islands

Subproject 13X—Telephone Exchange, Charlotte Amalie

PROJECT No. 9-VIS, ST. CROIX TELEPHONE SYSTEM
(Project No. 14, Public Law 516, 78th Congress)

Subproject 14A — Outside Telephone Plant, St. Croix

Subproject 14B—Inside Telephone Plant, Christiansted and Frederiksted

Subproject 14C—Subscriber Telephone Plant, St. Croix

Subproject 14X—Telephone Exchange, Christiansted and Frederiksted

At which time and place the proposals will be publicly opened and read aloud. Bids received after the time of bid opening will not be considered.

Plans and specifications and other proposal documents may be examined at the office of the District Engineer, Caribbean Area, St. Thomas, Virgin Islands; the District Engineer, Old Barge Theater Building, San Juan, Puerto Rico; and the Chief, Engineer Service, Washington, D. C. A deposit of $100 will be required for the set of plans and specifications, all of which will be returned to bona fide bidders upon the return of plans and specifications in good condition within seven days after date of bid opening.

Each proposal must be accompanied by a bid bond in an amount not less than 20 percent of the bid bid.

Bids will be accepted for any single unit, project or project.

The successful bidder(s) will be required to furnish performance bond(s) in the amount(s) specified in the bid form(s) and payment bond(s) in the amount(s) specified in the bid form(s), each bond to cover the performance of the contract(s) and payment of all persons performing labor and furnishing materials in connection therewith.

No proposal may be withdrawn after the scheduled closing time for receipt of bids for at least 90 days.

The Government reserves the right to reject any and all proposals and to waive informalities with respect to bids received.

FRED F. SEWALL

KENTUCK PROJECT, Bureau of Reclamation, Water Conservation and Utilization, Contract Advertisement for Bids, UNITED STATES DEPARTMENT OF THE INTERIOR, BUREAU OF RECLAMATION, SOUTH DAKOTA-WYOMING AREA OFFICE, Casper, Wyoming, April 17, 1950. Sealed bids will be received at the Area Office, Casper, Wyoming, until 10:00 o'clock A.M., Mountain Standard Time, May 16, 1950, and then publicly opened and read aloud, for furnishing the materials and constructing the Kentuck Project, Wyoming.

Copies of the detailed plans and of the specifications may be examined at the following offices of the Bureau of Reclamation: Area Engineer, Federal Building, Casper, Wyoming; Project Manager, Federal Building, Worland, Wyoming; Manager, P. O. Box 250, Cheyenne, Wyoming. Letters for prospective bidders for copies of the plans and specifications will be filled at the Area Office, Casper, Wyoming.

(Continued on page 96)

Contractors Watch This Section —

for new projects. Publish your announcements through the proposal sections of *Engineering News-Record* and get their bids.

OFFICIAL PROPOSALS
(Continued from page 95)

Bids May 31, 1950 (6993)

Sewage Treatment Plant, Intercepting and Outlet Sewers

THE LINDEN ROSELLE SEWERAGE AUTHORITY
LINDEN, N. J.

1. Sealed proposals for the construction of the herein described contracts of a pollution abatement project in the City of Linden, New Jersey, will be received by the Linden Roselle Sewerage Authority in the Council Chamber, City Hall, Linden, until 7:30 P.M. on Wednesday, May 31, 1950, and there publicly opened and read immediately thereafter.

2. The work will consist of providing all labor, materials, equipment and incidentals required for the construction of the following:

Contract I, Intercepting and Outfall sewer: (Approx. 1400 L.F. of 36-inch R.C. Pipe, 1500 L.F. of 18-inch R.C. Pipe, 2600 L.F. of 60-inch R.C. Pipe and appurtenant structures). *Contract II Plant Outlet Conduit & Force Main:* (Approx. 2600 L.F. of concrete theme, 20,000 L.F. timber piling, 2600 L.F. 24-inch R.C. Pipe, and appurtenant structures). *Contract V Sewage Treatment Plant General Construction:* (Primary treatment works including pumping station and including approx. 30,000 cu. yds. excavation, 5,000 cu. yds. of concrete, 2500 L.F. force main and fittings, 1500 L.F. timber piling, sluice gates, mechanical equipment and appurtenances). *Contract VI Sewage Treatment Plant Superstructures:* (Six brick and concrete buildings, approximate volume 170,000 cu. ft.). *Contract VII Structural Steel for plant buildings:* Approx. 500 tons). *Contract VIII Heating & Ventilating for plant buildings). Contract IX Plumbing Work (for plant buildings). Contract X Electrical Work (at sewage treatment plant).*

3. Plans, specifications, bidding and contract documents may be examined at the office of the Consulting Engineers, A.M. Kinney, Inc., 27 Cortlandt Street, New York, N.Y., and may be obtained upon the following deposits, per set:

Contract I, Intercepting and Outfall Sewer, $25.00; Contract II Plant Outlet Conduit and Force Main, $25.00; Contract V Sewage Treatment Plant General Construction, $45.00; Contract VI Sewage Treatment Plant Superstructure, $25.00; Contract VII Structural Steel, $10.00; Contract VIII Sewage Treatment Plant Heating & Ventilating, $25.00; Contract IX Sewage Treatment Plant Plumbing Work, $5.00; Contract X Sewage Treatment Plant Electrical Work, $5.00.

Full refund will be made to actual bidders for return of one (1) set in good condition within two weeks after opening date for receipt of bids; refund for return of another set, in good condition, within the same period will be fifty percent (50%) of the deposit. Plan deposit checks should be made payable to order of Alexander Potter Associates.

4. All proposals must be on the form furnished by the Authority.

All bids must be accompanied by a certified check or acceptable bidder's bond in the amount of ten (10%) percent of the amount of the bid made payable to The Linden Roselle Sewerage Authority, said check or bond will be returned to the unsuccessful bidder not later than sixty (60) days after opening of bids.

5. The successful bidder to each of the several contracts will be required to furnish a Performance Bond conditioned upon the faithful performance of the contract and upon the payment of all persons who perform labor and furnish materials in connection with the work.

6. No bidder may withdraw his bid within sixty (60) days after the date set for receipt of bid.

7. The Authority reserves the right to reject any or all bids and to waive any informality in the bid.

BY ORDER OF THE ACTING SECRETARY OF THE LINDEN ROSELLE SEWERAGE AUTHORITY
Charles B. Gross

DATED: April 27, 1950

READ THE OFFICIAL PROPOSAL COLUMNS OF ENGINEERING NEWS-RECORD THIS WEEK AND EVERY WEEK

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EMPLOYMENT

REPLIES: Box No. Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

CIVIL SERVICE

WANTED ENGINEER, city of Washington, Missouri. Send complete qualifications, etc. to City Clerk, Washington, Missouri.

POSITIONS VACANT

WANTED: EXPERIENCED structural Draftsmen capable of taking responsible charge of work. Salary between $4,200 and $5,000. Apply New York, N.Y.

RAILROAD CONCRETE plant designer and production man. Must be primarily with Railroad Work. Permanent position. Salary $ open. Write giving complete details, qualifications, etc. to Box 1000, Engineering News-Record.

CONSTRUCTION SUPERINTENDENT experienced in heavy building construction. Must be capable of handling men and equipment. Salary commensurate with ability. Permanent position. Please address Engineering News-Record.

WANTED: ESTIMATOR for heavy building construction. Must be experienced in reinforced concrete and structural steel. Salary commensurate with ability. Permanent position. Please address Engineering News-Record.

EXPERIENCED STRUCTURAL steel Designers and Detailers. Permanent positions. Salary commensurate with ability. Apply Box 1000, Engineering News-Record, New York, N.Y.

WANTED: EXPERIENCED Engineer, preferably with Master's degree, to teach Mechanics and Strength of Materials in Engineering College. Salary $ open. Write Box 1000, Engineering News-Record, New York, N.Y.

WANTED: EXPERIENCED Engineer, preferably with Master's degree, to teach Mechanics and Strength of Materials in Engineering College. Salary $ open. Write Box 1000, Engineering News-Record, New York, N.Y.

WANTED

2 Structural detailer—checkers

Permanent jobs for good men with experience in all types of bridge and building work.

Apply by letter, giving resume of experience, also salary desired.

PAXTON & VIERLING IRON WORKS
P.O. BOX 1085 OMAHA, NEB.

POSITIONS VACANT

CONTRACTORS ENGINEER superintendent experienced in general contracting construction work heavy reinforced concrete work on tunnels, bridges, highways, etc. Located within suburbs New York City. Applicant must have previous experience with a general contractor taking off quantities, estimating costs, and supervising the construction and equipment on a project. Must be capable of handling labor, subcontractors and purchasing. Give complete resume of experience, reference, with first letter. Salary expected and when available. Box 1000, Engineering News-Record.

DAVIS, BACON, TIDAL and Flying Engineers wanted for permanent employment on Dutch Harbor Naval Base project. Must be experienced in the construction of piers, docks, and other marine work. Apply in person to Room 1000, 000 East Main Street, Rochester, New York. Applicants must be capable of assuming full responsibility for handling all construction operations, including the procurement of labor and equipment. Must be capable of handling labor, subcontractors and purchasing. Give complete resume of experience, reference, with first letter. Salary expected and when available. Box 1000, Engineering News-Record.

(Continued on the opposite page)

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STRUCTURAL ENGINEERING

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R. W. BIXBY, Inc., 272 Dun Bldg., Buffalo 2, N. Y.

(Continued from the opposite page)

SELLING OPPORTUNITY OFFERED

SALES OPPORTUNITY for young engineer. Large manufacturer of power shovels and related equipment has opening in sales engineering for young engineer. Unusual opportunity for young engineer with ambition to grow with progressive organization. Location is metropolitan area of New York City. Excellent salary and expense. Reply, in confidence, stating full particulars, including age, education, experience and complete resume of background. SW-6264, Engineering News-Record.

EMPLOYMENT SERVICE

SALARIED PERSONNEL, $3,000-$25,000. The services of our organization are available to clients of high grade personnel who seek a change in connection under conditions assuring permanency and opportunity for progress. Personal interviews are held in confidence. Send for complete outline of background. SW-6264, Engineering News-Record.

POSITIONS WANTED

CIVIL ENGINEER, 32, Single, 4½ years experience in Engineering Supervision, Surveying, Estimating, Layout, Inspection, Design of Steel and Concrete Structures, Reinforced Concrete Pipe, Sewers, Water Supply, Drainage, Grading, Paving, Bridges, Airports, Dams, Reservoirs, Pumping Stations, Water Purification Plants, Sewage Treatment Plants, Water Supply, Flood Control, Soil Mechanics, Foundations, Pile Driving, Caissons, Cofferdams, Tunnels, Shafts, Trestles, Retaining Walls, Buildings, Reports, Specifications, Contracts, Cost Keeping, Office Management, Supervision of Construction, Inspection, Maintenance, Operation, Public Relations, Negotiations, Arbitrations, Valuations, Appraisals, Surveys, Plans, Estimates, Construction Equipment, Methods, Costs, Scheduling, Expediting, Purchasing, Personnel Relations, Labor Relations, Safety, Public Speaking, Writing, Research, Teaching, Consulting, Sales, Service, Operation, Maintenance, Management, Administration, Executive Ability, Leadership, Initiative, Resourcefulness, Dependability, Integrity, Character, Personality, Appearance, Health, Vitality, Energy, Enthusiasm, Loyalty, Cooperation, Adaptability, Versatility, Judgment, Tact, Diplomacy, Thrift, Economy, Efficiency, Accuracy, Speed, Neatness, Courtesy, Consideration, Sincerity, Modesty, Humility, Ambition, Aggressiveness, Perseverance, Determination, Confidence, Optimism, Cheerfulness, Humor, Imagination, Originality, Resourcefulness

POSITIONS WANTED
(Continued from preceding page)

CONTRACTOR'S "RIGHT Hand Man." Estimator, office engineer, C. E. grad. 11 yrs with contractor, heavy construction, subways, tunnels, etc. Experienced all phases construction work. PW-6376, Engineering News-Record.

CONSTRUCTION SUPERINTENDENT or Branch Manager. Heavy foundation or water front work, all types of piling, piers and sheeting. Prefer to locate Boston. PW-6361, Engineering News-Record.

AMBITIOUS CHIEF Accountant controller. Twenty-five years with leading engineering and construction firm. Know corporate setup, finance and costs all types construction. Broad background, joint venture and cost plus fixed fee projects. Employed but desire change. References and resume on request. PW-6371, Engineering News-Record.

GRADUATE CIVIL Engineer, 27, married, three years engineering experience with the U. S. government desires field or office position in east or middle west. Available August 1st. PW-6368, Engineering News-Record.

CONSTRUCTION ENGINEER 36, 15 years practical construction experience on building, housing, hospitals, waste, earthwork, mass concrete, bridges, etc. Knows reinforced concrete products plant layout. Good knowledge of concrete technology, batching, cost and control of concrete work. Seeking position of responsibility supervising heavy construction organization with aggressive construction organization. PW-6351, Engineering News-Record.

CONSTRUCTION SUPERINTENDENT or General Foreman desires position on foreign project, nature of work unimportant. Eight years of experience, ingenuity and ability to impress personnel. An thoroughly versed with reinforced concrete building construction, framing, pouring, etc., and have had considerable experience in erection of steel. Age 34, married, in excellent health. Have had years of experience on million dollar projects in U. S., Alaska, Greenland, Hawaiian Islands, Japan and Guam. Thoroughly capable leading, housing and paying men. Now employed but willing to go anywhere. Prefer employment in the U. S., but prefer foreign job which would offer difficulties and problems not encountered in domestic work. PW-6329, Engineering News-Record.

STRUCTURAL ENGINEERS. P.E. N.Y. state. Experienced in design of steel and concrete structures. Design free lance work on fee or hourly basis. PW-6359, Engineering News-Record.

GENL. SUPT. Construction Mgr. Actual bidding and all supervision of construction of heavy, specialized trades and self-contained operations. Diversified industrial plant, alterations and new bldgs. Open hearth furnaces, electric furnaces and steel bridges, tanks and concrete structures. Complete knowledge of modern methods and equipment. Has done rapid transit subways, surface R.R. grade separations, water disposal and pipelines, airports and have heavy concrete, earth and rock work experience. Prefer location in southeastern U.S. Background includes 20 years of successful operation. Must be capable of handling men and equipment. Will consider only men with good record of accomplishment. Will discuss projects from inception of condition, cost and profit basis. Give complete resume in complete confidence and detail first letter. Expense plus salary and bonus. Location, Atlanta, Ga. Write full particulars and qualifications. All replies will be answered promptly. Excellent fringe benefits, including hospitalization and dental. Excellent future. PW-6320, Engineering News-Record.

GRAD. C.E. specializing in 25 yrs exp. in concrete construction of dams, locks, etc. Has been a military consultant 3 months in every year. Now Midwest location preferred. PW-6352, Engineering News-Record.

EXPERT MAPS Office Assistant experienced chief clerk. Assistant Engineer, Surveyor, Draftsman, 20 yrs. Engineering News-Record.

CIVIL ENGINEER (grad.) 3 years' experience in design and construction of water supply, sewerage and drainage systems, also concrete structures design. Age 31, married. Prefer salary $400. Consider 5 day week. Location Atlanta, Ga. PW-6345, Engineering News-Record.

PART TIME WORK WANTED

ENGINEER SKILLED in design of Kiln and other refractory units and construction. Desires part time work on weekends. Box 5, Engineering News-Record, N. Y. 18.

PART TIME WORK WANTED

LAYOUT DESIGN. Estimates. Specs. Plants, material handling, buildings, industrial structures, timber, steel, concrete. Licensed P.E. (PWW-6362, Engineering News-Record.

BUSINESS OPPORTUNITY

Calif. Registered

Civil Engineer desires association with established engineer considering retirement. Prefer western or southwestern United States. PW-6365, Engineering News-Record.

PATENT ATTORNEY

Patent Practice

before U. S. Patent Office. Validity and infringement investigations and opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommel, Registered Patent Attorneys, Suite 415, 815 15th Street, N. W., Washington 5, D. C.

BUSINESS OPPORTUNITY

Patented Machine

makes venetian blinds. Highly profitable. Add one of 50 successful plants near you. Free Booklet. $625.00 in 24 payments. C. C. Equipment Co., 161 S. 13th St., Phila. 7, Penna.

SUBMERGED PIPE LINE CONSTRUCTION
BOYCE COMPANY
Phone 3-2530 Clearwater, Fla.

EXCAVATION WORK
Wanted for 2 months, 2 bulldozers, road grader, and 2 10 yard dumptrucks. Will take subcontract or tie daily basis. Anywhere in the United States or Foreign. Or will rent any piece of the above equipment. Write to
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HYSTER WINCHES
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Models D8N—D7N—D6N and D4N
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Phone: Laclede 8900; L.D.—5

WANTED
400 Lineal feet 7" Pumpcrete Pipe
complete with fittings
W-6399, Engineering News-Record
330 W. 42nd St., New York 18, N. Y.

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GOOD CONDITION
PRICE $4500.00
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1¼ yard capacity
CLAMSHELL OR DRAGLINE
Good condition—very reasonable
for details consult
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Legal Notice

1. SEALED BIDS for the sale of BOILERS AND STEAM POWERED ELECTRIC GENERATING EQUIPMENT WITH APPURTENANCES

will be received by the City of Coshocton, office at the office of the Director of Public Service in the City Hall, Coshocton, Ohio until

12 O'CLOCK, NOON,
EASTERN STANDARD TIME
THURSDAY, MAY 25, 1950

and at that time and place will be publicly opened and read aloud.

2. The equipment which is no longer required, and is being offered for sale by the city of Coshocton, consists in general of the following boilers and generating equipment with appurtenances now in use in the existing Waterworks power plant of the City.

a. 2—each 150 H.P. Erie City water tube boilers with automatic stokers powered by 2 H.P. electric motors with one spare motor. Includes blower, induced draft fan, 2 after pipes, feed water regulator, cochrane feed water heater, zeolite water softening unit.

b. 2—each 250 H.P. Skinner Engine Company universal Unaflow steam engines connected to 175 KVA alternators.

c. 1—Power and Light Switchboard with Voltage Regulator.

d. Steam Piping and miscellaneous small water piping and conduits with wiring.

3. All bids shall be submitted in letter form to the said Director, shall be on the basis of the equipment as listed above, the equipment as said equipment is now installed and shall include the removal of the equipment by the bidder from the existing power plant to the place of disposal by the bidder.

4. All bids shall be signed, shall state the price for each and all items, be complete, and shall be enclosed in a sealed envelope marked "Bid for Purchase and Removal of Existing Power Plant Equipment."

5. Each bid must contain the name of every person, firm or corporation interested in the same, and must be accompanied by a certified check on a solvent bank, in the amount of 20% of the bid, made payable to the City of Coshocton, the same as a guaranty that if the bid is accepted a contract will be entered into. The remaining 80% of the purchase price shall be paid to the City prior to the removal of all of the equipment. Successful bidder must provide Public Liability and Property Damage insurance with limits satisfactory to the Director of Public Service, and Workmen's Compensation Insurance. Unsuccessful bidders' checks will be returned within 24 hours of the scheduled time for receipt of bids.

6. The City of Coshocton, Ohio reserves the right to reject all bids and to waive any irregularities in bidding, and to accept the highest and best bid.

By Order of the Director
of Public Service
City of Coshocton, Ohio
Russell W. Hanlon, Director

BROWNING TRUCK CRANE
SACRIFICE $5500.
Mounted on White Prime Mover, 10 wheel, triple axle drive with outriggers. Located in N. J.
PS-6374, Engineering News-Record
330 W. 42nd St., New York 18, N. Y.

STORAGE BATTERIES
FOR SALE
24—Exide locomotive type TLM27 60 cells 120 volts, new in 1948-49; some never used. New price $6200 ea. Will sell for $3400.00 ea. with box, guaranteed.
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Phone GA 1-8151

ATLAS DIESEL ENGINE
Used, Model 5EN668, 5 cylinders 9" Bore x 10½" Stroke. 200 H.P. at 514 R.P.M. with Air Compressor. Starter and Compressor excellent condition, located at Teterboro, N. J.
PS-6330, Engineering News-Record
330 W. 42nd St., New York 18, N. Y.
520 N. Michigan Ave., Chicago 11, Ill.

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Lorain 79 diesel powered 1½ yd shovel. Caterpillar D13000 engine.

Lorain 77 diesel powered 1½ yd shovel and crane. Caterpillar D13000 engine.

Marion 1 yd diesel powered heavy duty truck crane on heavily reinforced Mack.

Lorain 40B ¾ yd shovel clam, new 30' cuts.

P&H Model 100 ⅜ yd. shovel.

SHOVEL & CRANE ATTACHMENTS

Lorain 75 shovel attachment.

Chain crowd L40-41 shovel attachment.

P&H 203 shovel attachment.

Chain crowd Lorain 30A shovel attachment.

Lorain 40 Hi-Lift shovel attachment.

Bucyrus-Erie 30B tunnel front attachment.

Koehring 301 dragline fairlead.

Backhoe Buckets & Attachments

¾ yd Lorain, 40, LBS ☰6105, 44" cutting width, teeth, sheave.

27" outside width drop bottom type LBS ☰1033, good condition.

26" outside width solid bottom type LBS ☰4377, good condition.

¾ yd Amsco 40" cutting width, LBS ☰8101.

Lorain 30 hoe attachment.

NEW TAGLINES

McCaffrey Model 648 for 1¼ to 2 yd crane.

McCaffrey Model 636 for ¾ yd to 1 yd crane.

SHOVEL DIPPERS

Lorain 41, ¾ yd, LBS ☰7433, new condition.

New Lima 1 yd, Amsco, LBS ☰2295.

Bucyrus-Erie 1¼ yd gas air, LBS ☰3782, fair.

Lorain 75 manganese 1¼ yd, LBS ☰7233, teeth and bail.

Lorain 75B, 1¼ yd extended lip, 1¾ yd LBS ☰2260.

Pettibone-Mulliken 2 yd Lorain 82 or 820, manganese, LBS ☰5361.

Pettibone-Mulliken 2 yd for 3500 Manitowoc LBS ☰5763.

CLAM—DRAG—SCRAPER BUCKETS

AIR COMPRESSORS

Worthington, two-stage, water-cooled, vertical 250☰ 80 CFM, new condition.

Ingersoll-Rand 105 cubic foot, Waukesha gas-line power, on two rubber tires.

Gardner-Denver 105 cubic foot with air receiver, hose reel, driven by power take-off and mounted on 1941 Ford.

Gardner-Denver, air-cooled 105 cubic foot with air receiver, V-belt drive from power take-off and mounted on 1942 Ford chassis with Wood two-yard dump body.

LeRoi 2-stage 105 cubic foot air-cooled, skid mounted, built-in tool boxes, hose reels and hose.

Gardner-Denver two-stage 160 cubic foot skid mounted.

Schramm 210 cubic foot with International UD14 diesel.

Worthington 210 cubic foot, two-stage, air cooled, on steel wheels with Hercules diesel.

Chicago Pneumatic 210 cubic foot, two-stage, air-cooled, Caterpillar diesel on four rubber tired wheels.

Gardner-Denver 315 cubic foot two-stage, skid mounted, Murphy four-cylinder diesel.

Pennsylvania 12" x 10" class 3A single cylinder, 355 cubic foot P.D., flat belt driven 50 HP slip ring motor.

New Gardner-Denver 500 cubic foot two-stage water-cooled, D13000 Caterpillar diesel on 4 pneumatics. Used 2 months.

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18 x 36 Farrell deep jaw crusher.

10 x 36 Cedarapids, practically new.

10 x 7 Allis Chal. Blake type jaw crusher.

Cedarapids No. 1 Kubit.

60 ton 2 compartment storage bin with clam shell gates.

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1½ ton Ford & Chevrolet.

2½ ton GMC. New and rebuilt.

Sterling COE Model 255GCS tandem drive tractor 9.00x24 tires, 200 HP Cummins supercharged diesel, complete with 40 ton Rogers low bed equipment trailer, 16—7.50x20 tires, airbrakes, outriggers, excellent condition.

2,000 gallon tanks on semi-trailer mounting.

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New IXD Hercules Gasoline.

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27E Koehring Paver.

Jaeger 3 yd hi-discharge truck mixer.

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Blaw-Knox gas-electric 10½'-12½', rebuilt.

2 Koehring 10'-12', rebuilt.

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830'—Truscon 7"x8" forms, with stakes.

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Cleveland formgrader, new condition.

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Apsco Model T34, 3-4 ton tandem.

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Apsco trench roller.

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Buffalo-Springfield 10 ton, three wheel.

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1½ KW to 125 KW, alternating and direct current, gasoline and diesel powered.

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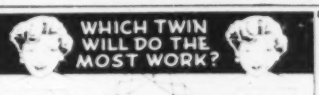

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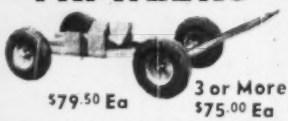

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15 Ton Ratchet Lever Jack. Automatic Lowering Ratchet Jack. 15 Ton Capacity. Height closed 28". Rise 15". Wt. 94 Lbs. 60" Handle. Extra heavy base with feet forged to the rack bar, insuring maximum strength at this point.

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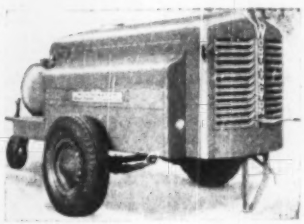

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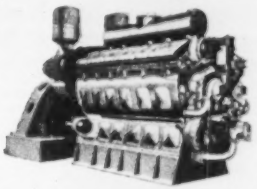

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KVA	Make	Model	HP	RPM	KVA	Make	Model	HP	RPM
[illegible]	Continental Motors	[illegible]	[illegible]	[illegible]	[illegible]	Enterprise	[illegible]	[illegible]	[illegible]
[illegible]	Continental Motors	[illegible]	[illegible]	[illegible]	[illegible]	Enterprise	[illegible]	[illegible]	[illegible]
[illegible]	General Motors	16-278A	[illegible]	[illegible]	[illegible]	General Motors	6-268A	[illegible]	[illegible]
[illegible]	General Motors	12-567	[illegible]	[illegible]	[illegible]	Clark	[illegible]	[illegible]	[illegible]
[illegible]	Allis	[illegible]	[illegible]	[illegible]	[illegible]	General Motors	6-268A	[illegible]	[illegible]
[illegible]	Buda	[illegible]	[illegible]	[illegible]	[illegible]	General Motors	[illegible]	[illegible]	[illegible]
[illegible]	Buckeye	[illegible]	[illegible]	[illegible]	[illegible]	Int'l Harvester	[illegible]	[illegible]	[illegible]

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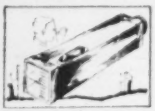

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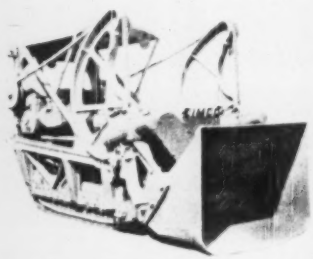
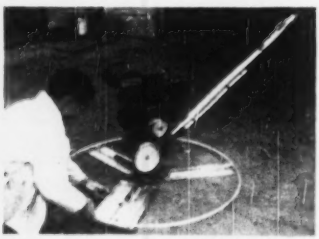


Overhead Loader

The Model 104 Unico Rocker Shovel can be used for loading all types of bulk materials. It operates on the Unico power-arm principle and throws the load overhead to discharge. Rated at 4 to 6 yd per min, the 104 has a 10- to 15-sec operating cycle. Power is provided by a 45-hp diesel engine or a 50-hp electric motor. Truck gate is 44 in. high, clear width 13 in. The 104 has 3 forward speeds, 1 reverse speed, an automatic power cut-off at discharge to retain bucket, and has a total weight of 22,000 lb. Attachments available include a bulldozer blade, lift fork, and hoist drum.—The Unico Corp., 634 S. 4th West St., Salt Lake City 5, Utah.



Float Finishing Machine

Mechanical concrete troweling machine produces a dense wear-resistant slab, free from ridges and depressions. Flooring is performed with Snap-On float blades which can be installed or removed in a few seconds. For finishing, floats are removed and tool-steel finish trowels are employed. With the machine in motion on the slab, a turn of the control knob on the handle changes trowel pitch as desired. Available with gasoline-engine or electric motor drive.—Whiteman Mfg. Co., 3249 Casitas Ave., Los Angeles 26, Calif.

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Made of 26-in. steel, ribbed for maximum strength, the Cleveland cross bridging is available in 20- and 17-in. lengths to fit any normal beam construction. Supplied straight, the flat ends are easily bent in nailing operations to conform to beam arrangement, even if the beams are slightly off center. Flattened ends permit subfloor to be installed directly over bridging.—Cleveland Steel Specialty Co., Inc., 3775 E. 91st St., Cleveland 5, Ohio.

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Powdered chromium-carbon material produces a carbonizing, nitriding, and chromizing action on tool steel resulting in a tough, uniform case. Hard N Deep is used with standard shop equipment—part to be hardened is heated to cherry red, dipped in the compound, brought back to temperature, and quenched. One treatment produces a case of about .005 in. Deeper penetration can be obtained by additional applications.—The Miracaloy Corp., 50 Broadway, New York 4, N. Y.

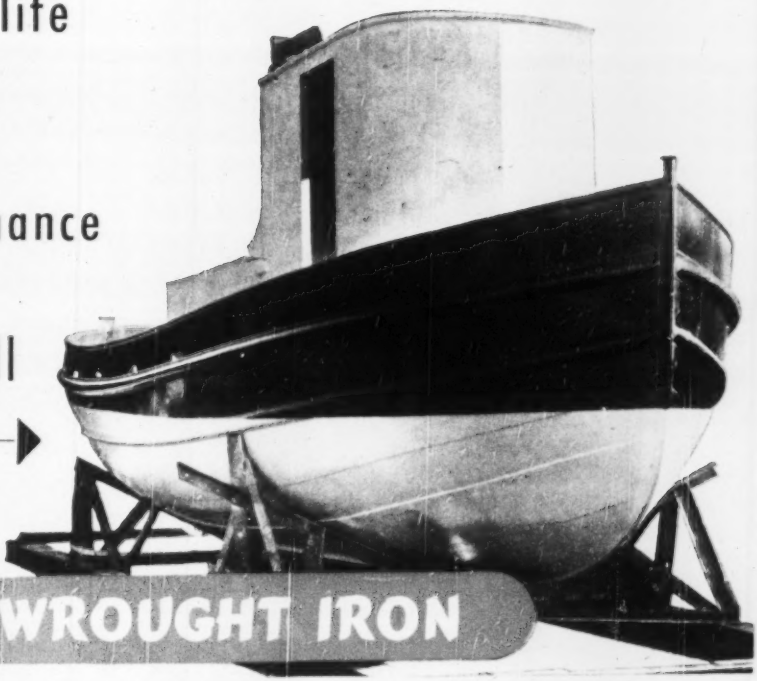
High-Speed Earthmovers

Two additions to its line of earth moving equipment have been announced by LaPlant-Choate. The TS-200 Motor Scraper is a self-propelled, rubber-tired high-speed earth

(Continued on page 109)

EXPERIENCE PREDICTS

longer life and lower maintenance for this hull



it's BYERS WROUGHT IRON

This latest addition to the tug fleet of the Norfolk Dredging Company, shown here in the yard of the American Electric Welding Company, Inc., is fortified against corrosion with a hull of Byers Wrought Iron. Several previous tugs in the fleet utilized the same time-proven method to avoid excessive maintenance and premature replacements . . . including the "Smith", which has been in continuous service for 53 years!

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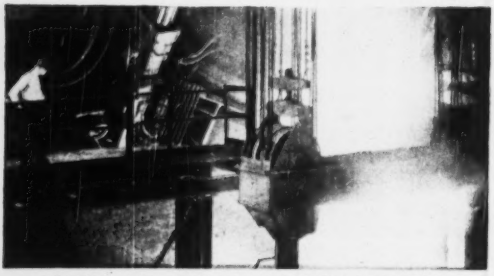

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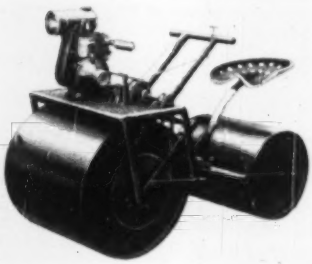
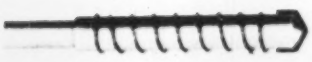
mower with a 9 to 12-cu capacity. Powered by a Buda 145-hp diesel engine, it has a top speed of 25.44 mph with standard transmission. An optional transmission provides a top speed of 27.4. Steering and scraper controls are hydraulic. The LW-500 Motor Wagon has a 14-cu struck or 19-cu heaped capacity. It is powered by a Buda 225-hp diesel and has a top speed of 21.2 mph. Doors are hydraulically controlled. Tractor of the wagon is identical to that of the LS-500.—LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa.



Light-Duty Roller

Double-purpose roller can be used with a seat, or converted to a walk-behind type by removal of the rear section. As a tandem roller, it has an empty weight of 525 lb, a full weight of 860 lb. The MotoRoller will turn in a 5-ft radius. Removal of the rear section is accomplished by withdrawal of a single draw pin. Main roller has a 24-in. dia. x 24-in. width. MotoRoller is powered by a 4-hp Briggs and Stratton gasoline engine.—Gabb Mfg. Co., 16 Orchard St., East Hartford 8, Conn.



Spiral-Fluted Masonry Drill

Applying "high-tensile" wire to masonry drills in the form of a low-spiral helix results in faster drilling and automatic hole cleaning. Dust cut loose by Lee Spiral drills is carried to the top of the hole and deposited in a mound around the outside diameter of the hole. The Carboloy drills fit any rotary drill, drill press, or hand brace, and are available in 10 diameter sizes ranging from ¼ to 1 in.—Carboloy Co., Inc., Box 257, Roosevelt Park Station, Detroit 32, Mich.

Pump Protecting Unit

Control prevents damage to pumps caused by running without discharge.

(Continued on next page)

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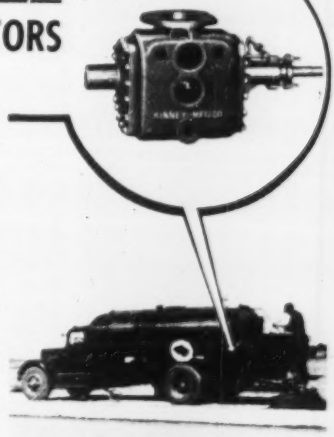

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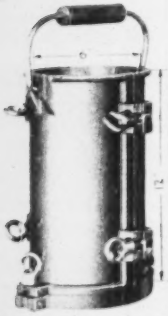

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Accurately machined to produce concrete samples of exact measurement. Sturdily made of refined malleable iron. Strong bronze wing nuts and swing bolts. Inside dimensions shown above. Portable. Your order will be promptly handled. If you want additional information write

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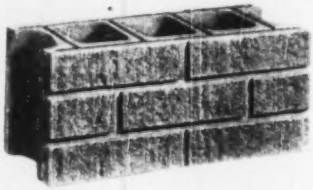
ing water. The Protectrol automatically stops pump, and keeps it from starting until manually reset, in event of mechanical failure, lowering of the water table, or any other cause for water not being discharged when pump is placed in operation. Emergency condition causes unit to energize audible alarm circuit and warning light.—Automatic Control Co., 1005 University Ave., St. Paul 4, Minn.



Brick-Faced Concrete Block

Concrete blocks are now available with a colored-cement brick facing applied in such a manner that the facing is an integral part of the block. Bric-Blocks are available in any color or combination of colors, with a plain or tough brick facing, in all standard sizes. The Bric-Blocks are said to combine the beauty and durability of brick with the economy of block construction.—National Bric-Block, Inc., Lindeke Bldg., St. Paul, Minn.

Light, 4-Wheel-Drive Truck

A light-duty four-wheel-drive truck has a gross-vehicle-weight of 14,500 lb. Previously, 17,000-lb gross-vehicle-weight has marked the beginning of the LWD line, which extends up to 58,000 lb. The LD has been designed for light-duty use requiring the added traction of 4-wheel-drive design, and where conversions have not proved satisfactory.—The Four Wheel Drive Auto Co., Clintonville, Wis.

Water-Meter for Concrete

Auto-Stop meter automatically controls quantity of water used for concrete batches. It consists of a Model 432 register mounted on a Neptune liquid meter coupled with a quick-closing valve. Tripping mechanism is actuated by buttons on the register. After delivery, the register is cleared by turning the reset handle. A totalizer keeps cumulative totals. Flow can be stopped instantly at any time by pressing the emergency stop button. Available in capacities from 30 to 100 gpm.—Neptune Meter Co., 50 W. 50th St., New York 20, N. Y.

New Product Briefs

Hydro-Power injector saturates a controlled amount of air with water vapor and injects this mixture into the manifold after carburetion resulting in lowered fuel costs, increased performance, reduced preignition, reduced carbon deposits, and longer engine-life. Maker: Hydro-Power Mfg. Co., Denver, Colo.

Fractional-hp motor, Model 1100, is brush-type unit with a 1/20-hp intermittent and 1/25-hp continuous-duty rating. Maker: Electric Motor Corp., Racine, Wis.

Corrosion-resistant globe valve, in 1 and 2-in. sizes, is designed for shut-off and throttling service with corrosive fluids free from abrasive solids. Except for Teflon packing, all valve parts in contact with fluid are Karbate impervious graphite. Maker: National Carbon Division, Union Carbide & Carbon Corp., New York 17, N. Y.

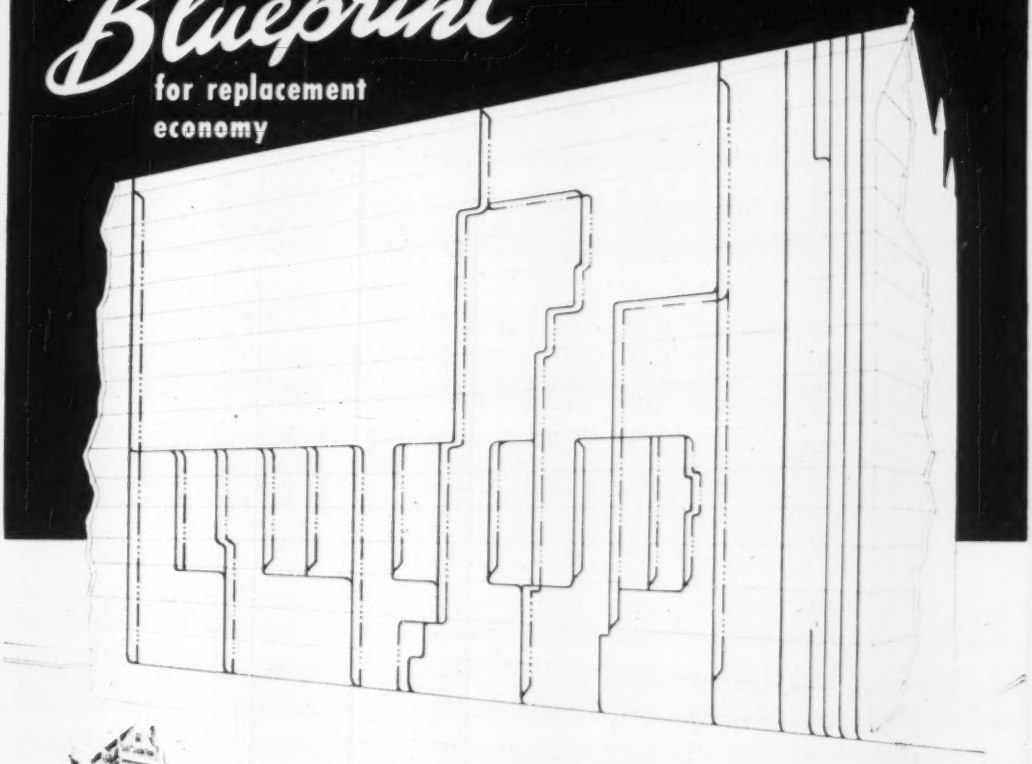
Motorless pressure sprayer for paints, disinfectants, and other liquids has a 2½-qt steel container with a lid which holds a hand pump for building up pressure in the container. Lid of the NoMotor sprayer is tested for pressures to 150 lb. Maker: NoMotor Corp., Cincinnati, Ohio.

Portable traffic signal, manufactured by Peters Metal Products Co., Hawthorne, Calif., is non-electric and completely automatic and portable. Operating on a 24-hr spring-wound motor, the device employs a revolving drum lettered "stop", "go", and "caution". It has an adjustable stand with a maximum height of 7½ ft, a minimum of 4 ft.

Power plane for woodworkers, Model 101, has maximum cutting width of 13/16 in.; operates at 20,000 rpm; weighs 5 lb; and has an adjustable apron which permits bevel cuts from 0 to 25 deg. Motor is interchangeable with Porter-Cable's Guild Router.

Ten-inch quick-change gear lathe is in production in four bed lengths. A complete line of tools and attachments is available. Maker: South Bend Lathe Works, South Bend 22, Ind.

Blueprint
for replacement economy



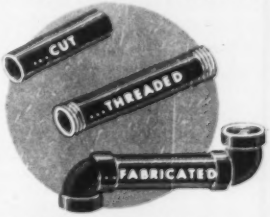
Dark lines of this schematic drawing, developed from authentic plumbing riser diagram, indicate where Clow "IPS"* (threaded) Cast Iron Pipe was used on complete replacement job of downspout, waste, vent and soil pipes in the University Club, Chicago, to assure a century or more of service.

Ordinary piping in a plumbing system subject to alternating "wet and dry" conditions, almost immediately following installation starts the battle against nature's destructive force — corrosion. This was illustrated in the above case, where some of the original pipe had entirely disintegrated, due to rust. During the last four years, M. J. Corboy & Co., Plumbing Contractors, replaced over a mile of vent-stacks, waste lines, downspouts and soil pipe with Clow "IPS" (threaded) Cast Iron Pipe . . . thus assuring a century or more of trouble-free service. An interesting point to note is that they were able to do this tremendous overall replacement job without disturbing the building's occupants.

Clow "IPS" Cast Iron Pipe is available with plain or threaded ends in 3, 4, 5, 6, 8 and 10" sizes in 18' random lengths. Also furnished with integral caulking bell on one end (other end plain) in 18' random lengths and 4, 6 and 8" sizes.

* "IPS" is iron pipe size O.D.

CLOW "IPS" CAST IRON PIPE CAN BE



on the job, with ordinary tools of the piping trade.

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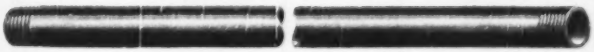

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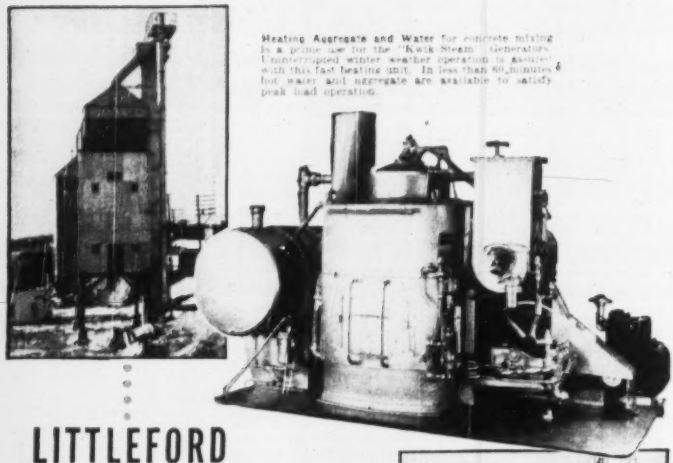
and their National Cast Iron Pipe Division, Birmingham, Alabama; subsidiaries Eddy Valve Co., Waterford, New York; Iowa Valve Co., Oskaloosa, Iowa.



Heating Aggregate and Water for concrete mixing is a prime use for the "Kwik-Steam" Generators. Uninterrupted winter weather operation is assured with this fast heating unit. In less than 60 minutes hot water and aggregate are available to satisfy peak load operation.

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VAPOR GENERATORS

FOR PILE DRIVING
AGGREGATE HEATING
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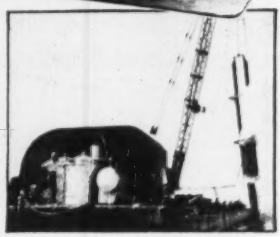

Pile Driving Contractors have found the "Kwik-Steam" Generators the fast work in efficiency and economy. "Kwik-Steam" Generators cuts labor cost and speeds up operations. From a cold start, the hammer can be working in a few minutes. Steam is only produced when it is needed.

"Kwik-Steam" Generators can be furnished with a steam chest if desired.

These "Kwik-Steam" Vapor Generators are the most modern steam producing units ever developed for application in industry. From a cold start the Littleford "Kwik-Steam" Generators will produce steam in two minutes time. Designed for low cost operation and fast heating, these units are used in Ready Mixed Concrete Plants, Asphalt Plants, Pile Driving Contractors as much as 50% on sales and fuel. Automatically controlled, the "Kwik-Steam" Generators will operate only when steam is needed, the Burner cycles off when steam is not needed. Once the "Kwik-Steam" Generators are started, automatic controls take over and keep a predetermined pressure at all times. Safety in operation is achieved by fool proof controls. Since the "Kwik-Steam" Generators burn low cost fuel oil no hand fuels are required as in the case of hand fired boilers. Other uses for "Kwik-Steam" Generators are Steaming Aggregate Cars, Water Heating, Operating Steam Hoists, Granite Equipment, Heating Asphalt Tank Cars, Asphalt Plants and Curing Concrete Blocks. "Kwik-Steam" Generators are made in sizes from 500 lbs. to 4000 lbs. of steam per hour.

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Manufacturers' Publications

Equipment Rental Rates—Fifth Edition of "Compilation of Rental Rates for Construction Equipment" is now available. The compilation is published for informational purposes only and is not intended to suggest or to influence rates or conditions of rental. Rates listed (for 266 major items of construction equipment) represent an overall average of rentals charged by equipment distributors throughout the United States. Cost of the compilation is $3.00.—ASSOCIATED EQUIPMENT DISTRIBUTORS, 360 N. MICHIGAN AVE., CHICAGO 1, ILL.

Lodgepole Pine Facts Folder—Four-page illustrated folder lists facts concerning Lodgepole Pine, one of the associated woods of the western pines. It reviews growth range and characteristics of Lodgepole Pine, and its properties and uses in the building field. This pine is similar in properties to Ponderosa Pine and is used as siding, studding, sheathing, decking, and paneling.—WESTERN PINE ASSN., 510 YEON BLDG., PORTLAND 4, ORE.

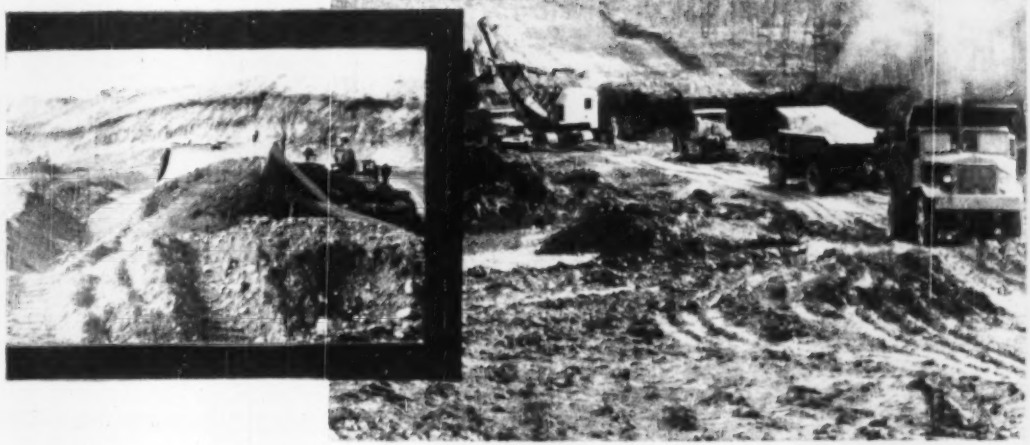
Chemical-Resistant Coatings—Folder describes the W&W line of chemical-resistant coatings. It contains valuable information on applications for maximum chemical, moisture, and rust resistance for all metals, concrete, and wood.—THE WILBUR & WILLIAMS CO., GREENLEAF & LEON STS., BOSTON 15, MASS.

Industrial Safety Equipment—Catalog (64 pp) lists a line of eye and respiratory equipment, plus a fund of technical and reference material. This has been included to help user select proper type and style of equipment for specific hazard involved, and to provide information on use and care of the equipment. Charts throughout the catalog show at a glance the comparative features of various styles, and aid in selection of most comfortable style for the user.—WILLSON PRODUCTS, INC., READING, PA.

Aluminum Building Products—Two bulletins are now available listing Alcoa building products. Bulletin AD-137 (20 pp) contains complete information on construction and installation of the Alcoa window sills and thresholds. Feature of the catalog is an illustrated description of typical details and installation procedures. Bulletin AD-135 (16 pp) describes

(Continued on page 117)

D. V. Frione & Co., Inc., New Haven, Conn. has a $5,288,814 contract to construct the Mansfield Hollow flood control dam on the Natchaug River at Mansfield, Conn. The concrete spillway will be 690 feet long and 60 feet high. This will be flanked at both ends by earth dams totalling 12,000 feet in length.



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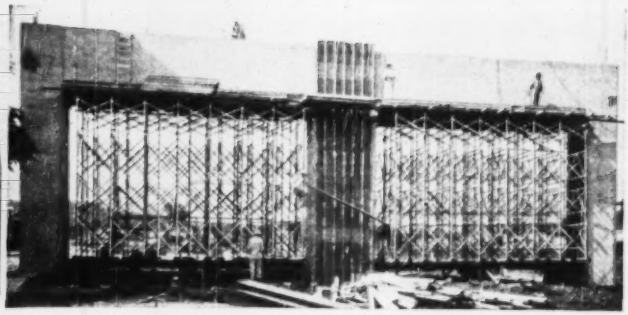

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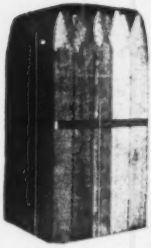

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2x2	18"	8.15	7.00
2x2	24"	8.70	7.90
2x2	24"	10.45	9.50
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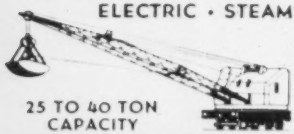

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Metal copings and gravel stops. This catalog also features a detailed description of installation procedures, and a listing of sizes and specifications.—Aluminum Co. of America, 801 Gulf Bldg., Pittsburgh 19, Pa.

Tractor Service Manual—Instructions for proper operation, maintenance, and repair of the HD-19 torque converter-equipped crawler tractor are contained in a 287-p service manual. The manual is divided into 23 sections covering all subjects. The bulletin sells for $5.00.—Allis-Chalmers Mfg. Co., Tractor Division Service Dept., Box 512, Milwaukee 2, Wis.

Switchboards—This 8-page folder describes switchboards for control of generation and distribution facilities of public and private utilities, industries, and institutions. Units listed in Bulletin 15B6139A include duplex switchboards for centralized control, benchboards for concentrated control of meters and relays, and rectifier control cubicles for rectifier auxiliary equipment.—Allis-Chalmers Mfg. Co., 1015 S. 70th St., Milwaukee, Wis.

Multi-Stage Centrifugal Pumps—Type OSMH multi-stage centrifugal pumps for boiler feed and high-pressure service are described in Bulletin 382. The bulletin describes construction of the pumps, lists various modifications, and employs a 2-color cutaway drawing to illustrate the 12 important operating features. Also listed are approximate general dimensions.—American-Marsh Pumps, Inc., Battle Creek, Mich.

Air Diffuser Selection Manual—Choice of proper air diffusers is simplified by this 68-p manual. It tells how to calculate required air volume and explains technique of locating diffusers and determining number of units required. Characteristics of 13 different types are listed.—Anemostat Corp. of America, 10 E. 39th St., New York 16, N. Y.

Waterproofing Compound—Instruction book explains handling and use of Anti-Hydro compound. This material is said to provide 100 percent waterproofness to concrete materials, build hardness and strength into monolithic concrete floors, and plug leaks in concrete against water pressure. It is also recommended to provide heat-insulating floor toppings, bond new mortars and concrete to old, prevent freezing of concrete and mortars at temperatures to 15 deg F, and to patch and repair old floors.—Anti-Hydro Waterproofing Co., 205 Bergen Ave., Newark 8, N. J.

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ENGINEERING NEWS-RECORD

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PERSPECTIVE . . .

Next step in welfare

It's a mighty small contractor who's unacquainted with workmen's and unemployment compensation. And before much more time goes by, the same thing will be true of disability compensation.

Disability benefits—a cousin, perhaps, of both workmen's and jobless benefits but different from either—is law in five states, effective in three. (Rhode Island, California and New Jersey). It becomes effective July 1 in New York, and a Washington law instituting it faces a referendum next fall.

• **Much legislative activity**—In 1949, there were 71 disability benefit bills before the legislatures of 16 states. Such benefits are part of the federal government's overall health program and are included in a bill (H.R. 6000) on which the House Ways and Means Committee has been holding hearings. However you look at it, disability benefits are, or are about to become, a management problem. It's a problem in which the construction business will find thorny going.

Workmen's compensation developed years back from public acquiescence in the concept that a lost-time accident suffered on the job should not be permitted to pauperize either the injured workman or his dependents. Unemployment compensation stemmed from the economic ability of U. S. business and industry to support, through payroll taxes, those it could no longer employ—and from the economic need for them to do so. Disability compensation falls somewhere on a line with these predecessors. It pays about half salary or wages to employed workers who are temporarily unable to work because of off-job illness or accident.

• **It's a tussle**—Plainly, the establishment in law of any such new social concept will involve considerable compromise. But beyond the din of specific legislative battle, there's a more basic issue at stake.

—The issue: Shall the payment of disability compensation be a state monopoly, or shall it be shared by non-public agencies (self-insured employers, private insurance)?

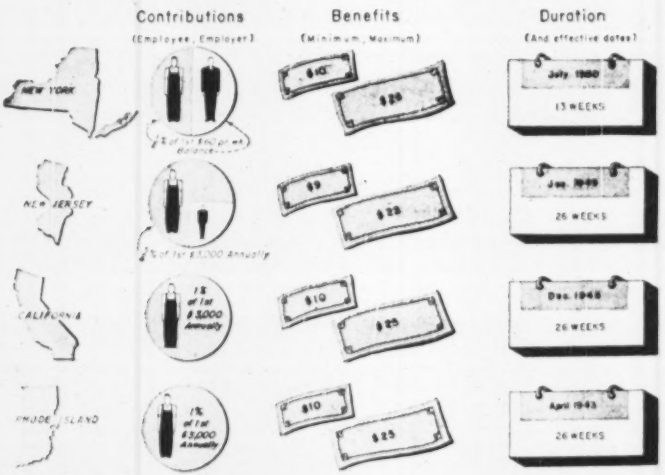
To explain it's simple.

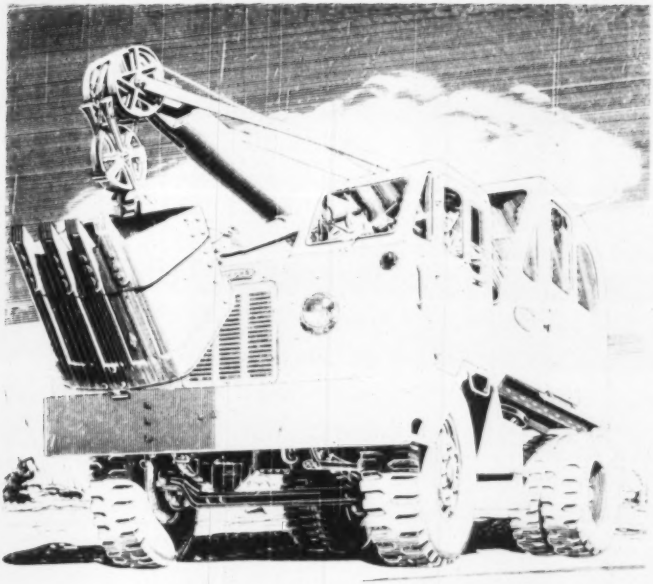
In granting workmen's compensation, the fact that John Doe was hurt while he was working for James Roe solves one big problem promptly, that of Doe's eligibility. If he hadn't worked for Roe, he wouldn't have fallen and broken his leg. Ipso facto, he's a workman and, if the claim is otherwise valid, eligible for workmen's compensation. And over the years, the incidence of such accidents has become actuarially predictable. You know how many will take place and what they'll cost. It's easy to insure against them, however you do it—and you can often do it less expensively than through a state fund.

• **Jobless benefits harder**—Unemployment compensation posed a vastly different problem. It's probably impossible to predict its incidence actuarially. And even if it weren't, the fact that a citizen has no job doesn't prove that he had one, or could or would take one if one were available. You must, in short, demonstrate that the jobless benefit claimant is "willing and able" to work, and that gets you into record keeping, bureaucracy and governmental control. It would be a risky operation to finance privately.

With disability compensation, you have a combination of both. Actuarially, you can tell how many workers are going to lose how much time from sickness or off-job accidents in a given period. But there's no automatic evidence that a claimant is eligible as a worker. So it's a program which can be established either way, completely government-dominated as is unemployment compensation, or publicly and privately controlled, as is workmen's compensation. In practice so far, Rhode Island has a completely government-dominated system; California and New Jersey have systems which have broken away from complete government domination but are less free than many workmen's compensation systems. New York has gone further than any in making its system a combination of public and private financing.

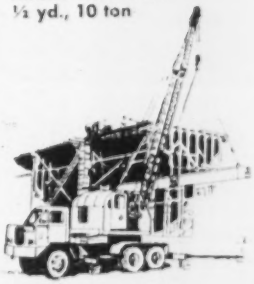
• **Stable payrolls would help.** Construction's ageless problem—that of an unstable working force—can complicate disability compensation as it is complicating life under Taft-Hartley. Specifically, there's the problem of which employer must pick up the check for a worker who gained eligibility while working for A but who was disabled shortly after switching to the payroll of B. Or, if he quits or is laid off and finds himself disabled before landing another job, who pays—the last employer or a state fund? Or consider the cost to the employer (all existing programs require contributions by workers, with employers paying the difference between these contributions and the cost). Won't competition between insurance companies often provide less expensive coverage than a mandatory state fund? But can't the opportunity for such competition bring about a situation wherein insurance companies take all the good risks, through competitive rates, and leave the costly risks to a state fund? The answer to each question, obviously, is yes. Management's job is to explore these and similar angles before the drive for disability compensation hits the legislatures with which management must live.





Model T6K
3/8 yd., 6 ton

Model TMDT-16
½ yd., 10 ton



Model TLDT-20
12 ton

Any MICHIGAN owner will tell you

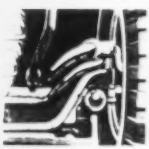
—why he bought a Michigan Truck Excavator. It could have been Michigan's famous mobility . . . the heavy duty Michigan truck chassis . . . high yardage through air controlled clutches . . . cast steel turntable base . . . hook rollers . . .

But why not let a Michigan owner tell you in his own words. Your local Michigan dealer welcomes the opportunity to show you the most complete line of 3/8 and ½ yard excavators available. It will pay you to get in touch with him *today*.

MICHIGAN
POWER SHOVEL COMPANY
500 Second Street
Benton Harbor, Michigan, U.S.A.

Series 8
½ yd., 8 ton

Model C-16
½ yd., 8 ton



EASY STEERING
Heavy duty worm and roller steering gear, 20 inch steering wheel minimize steering fatigue and help you thread through traffic easier, get around on the job faster.

EASY SHIFTING
Smooth meshing gears, no fighting the shift lever or clutch pedal. Auxiliary transmission provides multiple speed range for every highway condition for rough off the road travel.

POSITIVE TRACTION
Big traction tread tires easily pull you through deep sand, mud or heavy snow without delays. Their high flotation takes you over soft ground with far less danger of bogging down.

COMFORTABLE CAB
Operator's cab is roomy. Plenty of leg and elbow room for big men. Wide angle visibility through big rubber set windshield and windows. Foamlined, cushioned seat helps control fatigue.

How to help a walking dragline sidestep trouble

CARRYING a 180 foot boom and 25 cubic yard bucket, this Bucyrus-Erie 1150-B walking dragline sidesteps trouble with Timken® bearings at 14 critical points. Timken bearings hold shafts in alignment, reduce friction and keep maintenance time and material at a minimum.

Timken tapered roller bearings take heavy radial and thrust loads in any combination. Line contact between the rolls and races gives extra load carrying capacity. Due to the tapered construction of Timken bearings, they keep shafts in positive alignment, reducing wear on surrounding parts. Friction is virtually eliminated—thanks to the true rolling motion and incredibly smooth surface finish of Timken bearings. And because Timken bearings permit tighter closures, lubricant is retained—dirt is kept out.

Normally, Timken bearings last the life of the machine in which they are used because they are (1) engineered for the job, (2) are made of Timken fine alloy steel, (3) are precision manufactured.

No other bearing offers *all* the advantages you get with Timken bearings. They have more than fifty years of bearing research and development behind them. Insist on them in the machines you buy or build. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

The trade-mark "Timken" on a product means the bearings are the best

HERE'S WHERE BUCYRUS-ERIE uses Timken bearings in their 1150-B walking dragline to assure long, trouble-free service:

Swing machinery
first intermediate shaft . . upper and lower
second intermediate shaft . . . lower

Boom machinery
idler sheaves — *boom point sheaves*

Main machinery
intermediate shaft — *intermediate shaft*

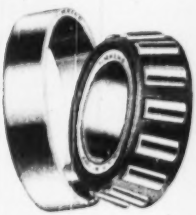
WE MAKE OUR OWN STEEL

The special grade alloy steel which gives Timken bearings their strength and resistance to wear, is made in our own steel mills.

The Timken Roller Bearing Company is the acknowledged leader in 1. advanced design, 2. precision manufacturing, 3. rigid quality control, 4. special analysis steels.

TIMKEN

TAPERED ROLLER BEARINGS



NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION